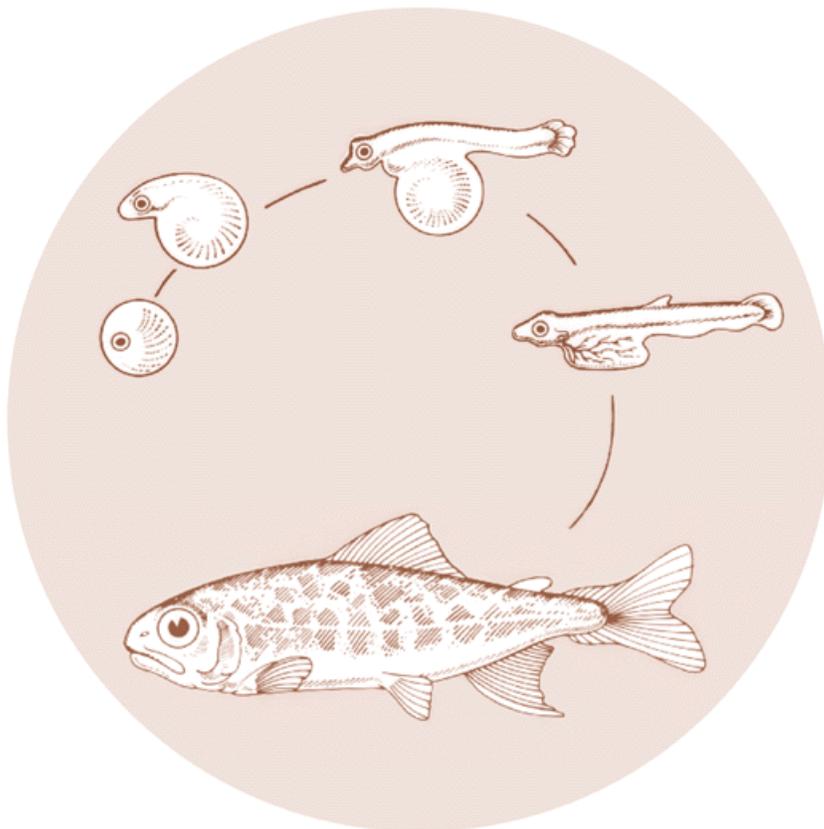


May 1990

# AUGMENTED FISH HEALTH MONITORING

Annual Report



DOE/BP-63461-4



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# AUGMENTED FISH HEALTH MONITORING

## Annual Report

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May 1990

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## INTRODUCTION

Since 1986 Washington Department of Fisheries (WDF) has participated in the Columbia Basin Augmented Fish Health Monitoring Project, funded by Bonneville Power Administration (BPA). This interagency project was developed to provide a standardized level of fish health information from all Agencies rearing fish in the Columbia Basin. Agencies involved in the project are; WDF, Washington Department of Wildlife, Oregon Fish and Wildlife, Idaho Fish and Game, and the U.S. Fish and Wildlife Service.

WDF has actively participated in this project, and completed its third year of fish health monitoring, data collection and pathogen inspection during 1989. This report will present data collected from January 1, 1989 to December 31, 1989 and will compare sampling results from 1987, 1988 and 1989. The analysis will be divided in two sections, adult and juvenile. The adult analysis will include results from screening at spawning for viral pathogens and bacterial kidney disease (BKD), and evaluation of causes of pre-spawning loss. The juvenile analysis will include pre-release examination results, mid-term rearing exam results and evaluation of the Organosomatic Analysis completed on index stocks.

A more detailed explanation of the overall project can be found in Michak et al (July, 1989).

## DESCRIPTION OF STUDY AREA

WDF operates 9 hatcheries in the Lower Columbia Basin, Columbia River mouth to Snake River confluence, and 5 hatcheries in the Upper Columbia Basin (including the Snake River drainage) Figure 1. Species reared include spring, summer and fall chinook and early (Type S) and late (Type N) coho. Watershed and species reared by hatchery are listed in Table 1.

## METHODS AND MATERIALS

Methods used to detect specific pathogens have been agreed upon by Project's steering committee. Generally all procedures follow the standards for pathogen detection in Amos (1985) (Table 2). Changes or deviations from 1988 methods are detailed in this report.

Sampling of adults and juveniles was conducted on site by staff fisheries biologists or fish pathologists. All samples, with the exception of bacteriology culture plates, are received at our main lab located on The Evergreen State College campus, Olympia,

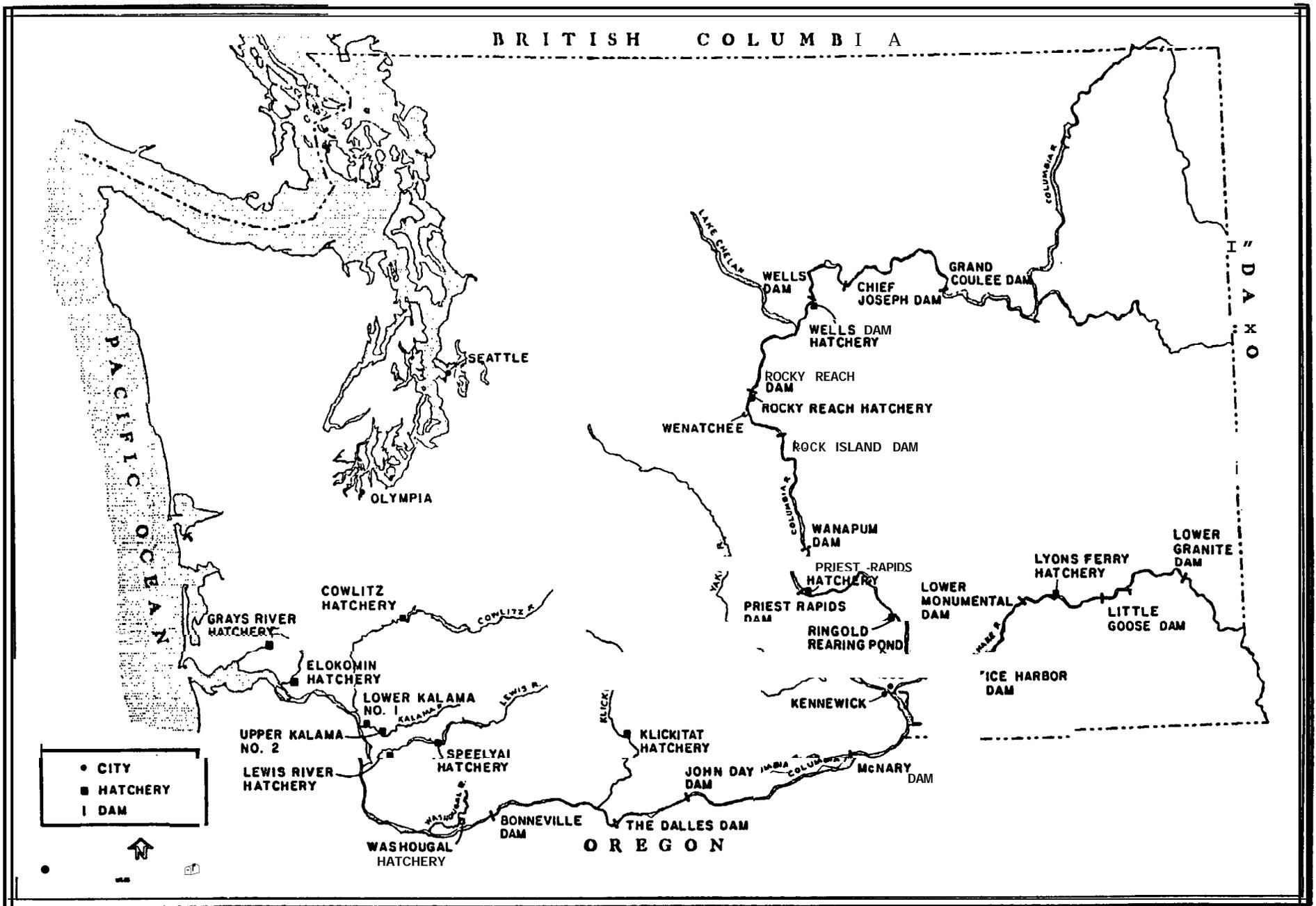


Figure 1. Washington Department of Fisheries Columbia Basin hatcheries.

Table 1. Washington Department of Fisheries Columbia Basin Hatcheries

Hatchery	Watershed	Rearing Program
LOWER COLUMBIA		
Cowlitz	Cowlitz River	Spring and fall chinook, and late coho.
Toutle	Cowlitz River	Early coho and fall chinook (rearing only).
Elokomin	Elokomin River	Fall chinook and late coho.
Grays River	Grays River	Fall chinook and early coho.
Kalama Falls	Kalama River	Spring and fall chinook, and late coho.
Klickitat	Klickitat River	Spring and fall chinook, and late coho.
Lewis River	Lewis River	Spring chinook, early and late coho.
Lower Kalama	Kalama River	Fall chinook and early coho.
Speelyai	Lewis River	Spring chinook and early coho.
Washougal	Washougal River	Fall chinook, early and late coho.
UPPER COLUMBIA		
Lyon's Ferry	Snake River	Fall chinook.
Tucannon	Tucannon	Spring Chinook.
Priest Rapids	Columbia River	Fall chinook.
Ringold	Columbia River	Fall and spring chinook, and early coho.
Rocky Reach	Columbia River	Fall chinook, early and late coho.
Wells Spawning Channel	Columbia River	Summer chinook.

Washington. Bacteriology is completed at our lab located in the Salmon Culture Division office, downtown Olympia.

From January 1, 1989 to December 31, 1989, fish health monitoring sampling was conducted on 23 adult stocks at spawning, 18 yearling releases (1987 brood), 12 sub-yearling "zero" age releases (1988 brood) and 18 midterm exams (1988 brood). In addition to sampling, processing, reading and recording all the above, monthly monitoring and diagnostic visits were completed and monthly hatchery rearing data and fish pathologists reports were entered in the database.

### Adult Analysis

Fish health monitoring of 1989 returning adults involved virus screening for Infectious Hematopoietic Necrosis Virus (IHNV), Infectious Pancreatic Necrosis Virus (IPNV), other replicating agents, Viral Hemorrhagic Septicemia Virus, Erythrocytic Inclusion Body Syndrome (EIBS), and BKD. The above sampling was done at spawning on all species returning to the facilities listed in Table 1.

Adults were also routinely examined during the pre-spawning holding period. Fresh mortalities were examined by the visiting fish pathologist to determine cause(s) of pre-spawning mortality. Special attention was given in looking for Furunculosis, Enteric Redmouth (ERM) and Ceratomyxosis to determine their role in pre-spawning mortality.

During 1989 the virology protocol was altered by inoculating ovarian fluid and kidney/spleen samples onto both EPC and CHSE-214 cell lines. Previously, ovarian fluid samples were inoculated only onto EPC cells and kidney/spleen samples only onto CHSE-214 cells. In addition EIBS blood films were stained with pinacynol chloride instead of Lishman-Giemsa.

### Juvenile Analysis

Monthly monitoring visits continued throughout 1989. All stocks and brood years at WDF Columbia Basin hatcheries were evaluated by the visiting fish pathologist to determine their general overall health condition. Routine exams included: external appearance, eye condition, fin integrity, gill condition, external and gill parasite prevalence, and internal organ color and quality. In addition the disease status of moribund fish and a cause for any increase in loss was determined by the appropriate method (gram stain, wet mount, bacterial culture, tissue culture, etc.) as determined by the pathologist following the agreed upon methods outlined in Table 2.

Pre-release examinations were conducted on 1987 brood yearling and 1988 brood "zero" age release groups at all stations listed in Table 1. Sixty asymptomatic fish were screened for IHNV, IPNV,

Table 2. Pathogen Detection Methods

Disease/ Pathogen	Life Stage	Tissue Sampled	Detection Method <sup>1</sup>
Viral			
IHNV	Juvenile	Kidney/spleen	Tissue culture EPC w/PEG and CHSE-214.
	Adult	Ovarian fluid	Tissue culture EPC w/PEG and CHSE-214.
IPNV	Juvenile & Adult	Kidney/spleen	Tissue culture EPC and CHSE-214.
EIBS	Juvenile & Adult	Blood film	Pinacynol chloride stain, two (2) minutes at 1000X.
Bacterial			
R. <u>salmoninarum</u>	<b>Juvenile</b> Adult <sup>2</sup>	Kidney smear Ovarian fluid	FAT, 30 fields at 600X. FAT, 30 fields at 600X.
<u>C. psychrophila</u>	Juvenile	Kidney or spleen	Gram stain.
<u>A. salmonicida</u>	Juvenile & Adult	Kidney or spleen	Culture TSA media.
<u>Y. ruckeri</u>	Juvenile & Adult	Kidney or spleen	Culture TSA media.
Parasite			
M. <u>cerebralis</u>	Juvenile	Head cartilage	Digest Method confirm by histopathology.
C. <u>Shasta</u>	Juvenile & Adult	Hindgut	Light microscopy.
PKX	Juvenile	Posterior kidney	Light microscopy, confirm by histopathology.

CHSE - Chinook salmon embryo 214  
EPC - Epithelioma papillosum cyprini  
IHNV - Infectious Hematopoietic Necrosis Virus  
IPNV - Infectious Pancreatic Necrosis Virus  
EIBS - Erythrocytic Inclusion Body Syndrome  
PEG - Polyethylene Glycol  
FAT - fluorescent antibody test  
TSA - Tryptic Soy Agar  
PKX - Proliferative Kidney X

<sup>1</sup> Amos, K., 1985. Procedures for the Detection and Identification of Certain Fish Pathogens. American Fisheries Society, Fish Health Section, Bethesda, MD. 119 pages.

<sup>2</sup> For detailed protocol see Appendix A.

EIBS, BKD and where appropriate Myxobolus cerebralis (generally sampled at midterm). In addition to the sixty fish sample, up to 10 moribund fish were sampled for viral pathogens. Tissues sampled and detection techniques are listed in Table 2. Additionally hematocrit data was collected on all release groups. Midterm exams were conducted on all yearling groups at approximately 6 months (or greater) into their rearing cycle. Exams included sampling 60 asymptomatic fish for BKD and sampling the most **susceptible** species, at hatcheries with surface water supplies, for IHN cerebralis. Organosomatic analysis based on Goede's method was performed at release on index station stocks. WDF index stations and stocks are: Cowlitz hatchery spring and fall chinook, Lewis River (Speelyai) hatchery early coho (Type-S) and Lyon's Ferry hatchery fall chinook. All stocks are coded wire tagged as required by U.S./Canada management and other projects.

### Historical Database

An update of adult contribution, expressed as % survival, at Index stations is presented in Appendix A. Percent survival is based on coded wire tag recoveries from all fisheries and hatchery rack returns. An evaluation of the project based on adult contribution can not be conducted until more broods (1985 and beyond) contribute to the fisheries and return to hatcheries.

## RESULTS AND DISCUSSION

Results of fish health inspections on adults and juveniles were recorded in two ways. For IHNV, IPNV and M. cerebralis results are listed as positive (P) or negative (N). The results are for the species and stock, prevalence is not given because we were determining just the presence or absence of virus or parasite in the population. If IHNV has been found previously or the population is suspect, additional sampling to the 60 fish was conducted (at WDF's expense). For all other pathogens results were listed as the number positive.

The following tables are a summary of adult or juvenile sampling completed in 1987, 1988 and 1989. Adults are listed by return year and juveniles are listed by brood year, yearling releases separate from zero releases.

### Adult Analysis

Results of inspections on 1987, 1988 and 1989 returning adults are shown in Table 3. IHNV was isolated from 6 stocks in 1989: Cowlitz spring and fall chinook, Kalama early coho, Lyons Ferry (Tucannon) spring chinook, Speelyai spring chinook and Wells summer chinook. IPNV and other replicating agents were negative in all

Table 3. Inspection Results of Returning Adults 1987, 1988 and 1989.

Species	Stock	Return Year	# Fish	IHNV Result	# Fish	IPNV Result	# fish	EIBS Result	Percent Positive	# Fish	BKD Result	Percent Positive
Hatchery-y: Cowlitz												
Spr ing	Cowl itz	87	778	P	60	N	60	22	37	60	12	20
Spr ing	Cowl itz	88	2520	P	60	N	60	0	0	60	0	0
Spr ing	Cow litz	89	213	P	60	N	60	1	2	60	1	2
Fall	cowl itz	87	2560	P	60	N	60	0	0	60	12	20)
Fall	Cowl itz	88	4778	P	60	N	60	1	2	60	3	5
Fall	Cowl itz	89	390	N	60	N	59	0	0	60	1	2
L. Coho	Cowl itz	87	2519	N	120	N	60	0	0	60	33	5 s
L. Coho	Cowl itz	88	5156	N	60	N	60	0	0	60	15	25
L.. coho	Cowl itz	89	120	N	60	N	60	1	2	60	9	15
Hatchery Elokomin:												
Fall	Elokomin	87	60	N	60	N	60	1	2	60	1	2
Fall	Elokomin	88	994	N	60	N	60	3	5	60	1	2
Fall	Elokomin	89	60	N	60	N	60	0	0	60	0	0
L. Coho	Elokomin	87	60	N	60	N	60	3	5	60	8	13
L. Coho	Elokomin	88	699	N	NS		NS	-	-	NS	-	-
L. Coho	Elokomin	89	60	N	60	N	60	0	0	60	18	30
E. Coho	Elokomin	88	402	N	60	N	60	0	0	60	7	12
Hatchery: Grays River												
Fall	Grays R iver	87	60	N	60	N	60	24	40	60	12	20
Fall	Grays R iver-	88	65	N	60	N	60	0	0	60	4	7
Fall	Grays R iver-	89	103	N	60	N	60	0	0	60	0	0
E. Coho	Grays R iver	87	60	N	60	N	60	4	7	60	2	3
E. Coho	Gt-ays R iver	88	60	N	60	N	60	0	0	60	0	0
E. Coho	Gr ays R iver	89	60	N	60	N	60	0	0	60	0	0
Hatchery : Kalama Falls												
Spr ing	Kal ama Fa lls	87	120	N	60	N	60	31	52	60	2	3
Spr irig	Kal ama Fal ls	88	223	N	60	N	60	0	0	60	0	0
Spr ing	Kal ama Falls	89	60	N	60	N	60	1	2	59	0	0
L. Coho	Kal ama Fal ls	87	60	N	60	N	60	1	2	60	0	0
L. Coho	Kal ama Falls	88	60	N	60	N	60	4	7	60	0	0
L. Coho	Kal ama Fal ls	89	60	N	60	N	60	1	2	60	37	62
Hatcthery: Kl ickitat												
Spr ing	Kl icki tat.	87	60	N	60	N	60	30	50	60	9	15
Spr ing	kl icki tat	88	60	N	60	N	60	0	0	60	3	5
Spr imy	K l icki tat	89	60	N	60	N	60	0	0	60	0	0

Results: N = negat ive P = pos it i ve for spec i es and stock # = \* positiue  
 NS = not samp I ed . NF = no f i sh.

Table 3. Insepection Results of Returning Adults 1987, 3.988 and 1989.

species	Stock	Return Year	# Fish	I HNV Result	# Fish	IPNV Result	# Fish	EIBS Result	Percent Positive	# Fish	BKD Result	Pet-cent Positive
<b>Hatchery: Lewis River</b>												
Spring	Lewis River	87	9	N								
L. Coho	Lewis River	87	60	N	60	N	60	2	3	60	15	25
L. coho	Lewis River	88	1192	N	60	N	60	0	0	60	3	5
L. coho	Lewis River	89	1604	N	60	N	60	2	3	60	13	22
<b>Hatchery: Lower Kalama</b>												
Fall	Kalama Falls	87	60	N	60	N	60	41	68	60	10	17
Fall	Kalama Falls	88	60	N	60	N	60	0	0	60	2	3
Fall	Kalama Falls	89	276	N	55	N	60	0	0	60	1	2
E. Coho	Lower Kalama	87	60	N	60	N	60	5	8	60	0	0
E. Coho	Kalama Falls	88	342	N	60	N	60	0	0	60	6	10
E. Coho	Kalama Falls	89	62	P	60	N	60	1	2	62	0	0
<b>Hatchery: Lyons Ferry</b>												
Spring	Tucannon	87	48	P	63	N	67	21	31	43	12	28
Spring	Tucannon	88	100	N	60	N	61	0	0	49	1	2
Spring	Tucannon	89	75	P	62	N	44	0	0	37	2	8
Fall	Lyons Ferry	87	1579	N	60	N	59	3	5	60	3	5
Fall	Lyons Ferry	88	60	N	60	N	60	1	2	60	1	2
Fall	Lyons Ferry	89	320	N	60	N	60	0	0	60	1	2
<b>Hatchery: Priest Rapids</b>												
Fall	Priest Rapids	87	116	N	60	N	60	0	0	60	0	0
Fall	Priest Rapids	88	2617	N	60	N	60	0	0	60	1	2
Fall	Priest Rapids	89	1745	N	60	N	60	0	0	60	1	2
<b>Hatchery: Speelyai</b>												
Spring	Lewis River	87	82	N	60	N	60	3	5	61	28	46
Spring	Lewis River	88	60	N	60	N	60	0	0	60	1	2
Spring	Lewis River	89	234	P	60	N	60	1	2	60	1	2
E. Coho	Lewis River	87	60	N	60	N	59	30	51	60	10	17
E. Coho	Lewis River	88	60	N	60	N	60	1	2	60	0	0
E. Coho	Lewis River	89	490	N	60	N	60	0	0	60	0	0
Sockeye	Wild	87	37	N								
Sockeye	Wild	88	7	N								

Results: N = negative P = positive for species and stock # = # positive  
 NS = r-d sampled NF = no fish.

Table 3. Inspection Results of Returning Adults 1987, 1988 and 1989.

Species	Stock	Return Year	IHN		PNV		EIBS		Percent Positive	BKD		Percent Positive
			# Fish	Result	# Fish	Result	# Fish	Result		# Fish	Result	
Hatchery:	Washouga 1											
Fall	Washouga 1	87	148	N	60	N	60	26	43	60	12	20
Fall	Washouga 1	88	NS		60	N	60	0	0	60	3	5
Fall	Washouga 1	89	1177	N	60	N	60	0	0	60	0	0
E .	CohoWashouga 1	87	12	N	37	N	37	5	13	12	5	42
E .	Coho Washouga 1	88	87	N	60	N	60	0	0	60	0	0
E .	Coho Washouga 1	89	NF		NF		NF			NF		
L .	Coho Washouga 1	87	60	N	60	N	60	0	0	60	9	15
L .	coho Washouga 1	88	60	N	60	N	60	1	2	60	3	5
L .	cot-u Washouga 1	89	60	N	60	N	60	0	0	60	7	12
Hatchery : Wel 1s												
Summer	Wel 1s	87	456	P	60	N	60	3	5	60	11	18
Summer	Wel 1s	88	60	P	60	N	60	0	0	60	5	8
Summer	We 11s	89	689	P	473	N	60	0	0	60	1	2

6

Results: N = negative P = positive for species and stock # = # positive  
 NS = not sampled. NF = no fish.

other stocks. Prevalence of EIBS was found to be only .64% in all species and stocks sampled, very similar to the 1988 prevalence of .83%.

Prevalence of BKD over all species in 1989 was 7.4% with 91% of the positive samples coming from the late coho stocks throughout the lower Columbia Basin. The late coho stocks were 28% positive for BKD. Comparison of the prevalence of BKD by species showed a decline for chinook and early coho stocks from the level seen in 1988, but a substantial increase was found in the late coho stocks (Table 4).

The use of antibiotic (erythromycin) injections at spawning is common in chinook stocks and will continue to be evaluated for efficacy. Use of antibiotic injections in coho is not routine and will be evaluated for application in late coho based on the results found here. The 1989 returning late coho were not injected pre-spawning with erythromycin.

Table 4. Prevalence of Bacterial Kidney Disease in spawning adult salmon differentiated by species in 1987, 1988 and 1989.

SPECIES	% positive		% positive		% positive	
	1987	n	1988	n	1989	n
Spring chinook	22.2%	284	1.7%	<b>289</b>	1.4%	<b>276</b>
Fall chinook	11.9%	420	3.6%	420	.7%	427
Summer chinook	18.3%	60	8.3%	60	1.7%	60
Early coho	8.9%	192	4.3%	300	0%	182
Late coho	21.7%	300	8.8%	240	28.0%	300

Pre-spawning mortality was monitored extensively throughout the adult holding period by staff fish pathologists. Adult pre-spawning loss was attributed to the following diseases and conditions: BKD, Columnaris, Furunculosis, fungus (Saprolegnia), handling, and normal holding mortality. Causes of loss were very similar to those in 1988. Loss is detailed in the Disease Prevalence Summary Report (Appendix B).

#### Juvenile Analysis

Monthly monitoring visits were completed by staff fish pathologists throughout 1989. Monitoring visits have been very instrumental in accurately determining cause of loss and attributing monthly loss to the appropriate cause or pathogen. By monitoring fish health on a regular schedule, prevention and or early treatment of a potential epizootic can occur.

Monthly loss to specific bacterial pathogens CWD, BKD, ERM, and Furunculosis was examined for 1987, 1988 and 1989. Loss was differentiated by pathogen and sub-basin (Lower or Upper Columbia).

Juvenile salmonid mortality to CWD has continued to increase throughout the Columbia Basin. Loss to CWD continues to be the highest attributable to one specific pathogen. Loss in the Lower Columbia Basin in 1989 followed the same pattern as seen in 1987 and 1988, with the peak of loss in May (Figure 2). Loss to CWD increased 17% in the Lower Columbia Basin from 486,598 in 1988 to 569,069 in 1989. The Upper Columbia Basin followed a bimodal distribution as seen in 1988, but with peaks of loss shifting slightly earlier to March and May in 1989 (Figure 3). Loss to CWD increased 45% in the Upper Columbia Basin over the 1988 level from 118,101 to 171,904.

Loss to BKD in the Lower Columbia Basin dropped 50% from the level of loss in 1987 and 1988. This reduction was due to the absence of any major epizootic in 1989. Total annual loss to BKD in the Upper Columbia Basin also declined from 1988 by 16%, and increased only minimally (4%) over the level in 1987. Pattern of loss was similar to that seen in 1988, with the peak of loss in April (Figure 4).

With no major ERM epizootics occurring in 1989 loss to ERM was reduced dramatically from the 1988 level. In the Lower Columbia Basin loss dropped 80% and in the Upper Basin there was a 98% reduction in loss attributed to ERM. Results of ERM vaccine trials at Klickitat hatchery were inconclusive with ERM not occurring at a significant level in either the vaccinated or non-vaccinated groups. Vaccine trials will be repeated in 1990 by WDF fish health and Klickitat Hatchery staff.

Loss to Furunculosis in 1989 was negligible.

Pre-release exam results for yearling stocks are presented in Table 5. Viral exams for IHNV, IPNV and other replicating agents were negative for all stocks in 1989. Prevalence of EIBS in 1989 elevated to 11.4% over all stocks from the 2.9% prevalence in 1988. Prevalence of BKD in yearling release groups was 4.4%, a great improvement from the 34.4% positive in 1988. This lower prevalence level is also reflected in the reduced loss attributed to BKD in 1989 in both the Lower and Upper Columbia Basin.

Pre-release exam results for the zero age releases are presented in Table 6. Viral exams for IHNV, IPNV and other replicating agents were negative for all stocks in 1989. Prevalence of EIBS in 1989, .14%, continued to decline from that found in 1988 (4.3%). Prevalence of BKD in the zero age releases also was significantly improved with only 2.1% positive in 1989 as opposed to the 30% prevalence level found in 1988.

Hematocrit data has been collected during pre-release exams on

# Juvenile LOSS to CWD Lower Columbia

WDF hatc heries

12

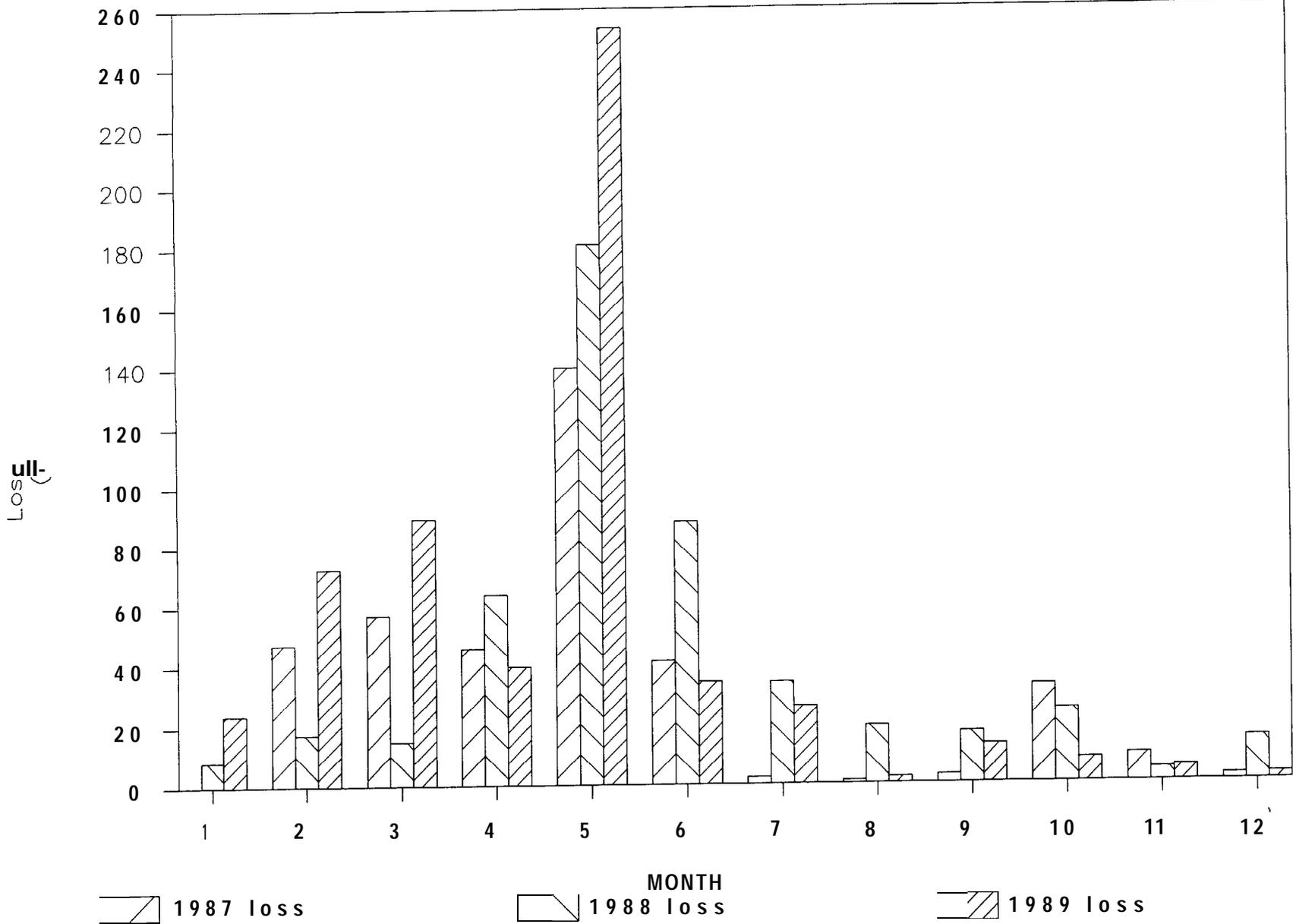
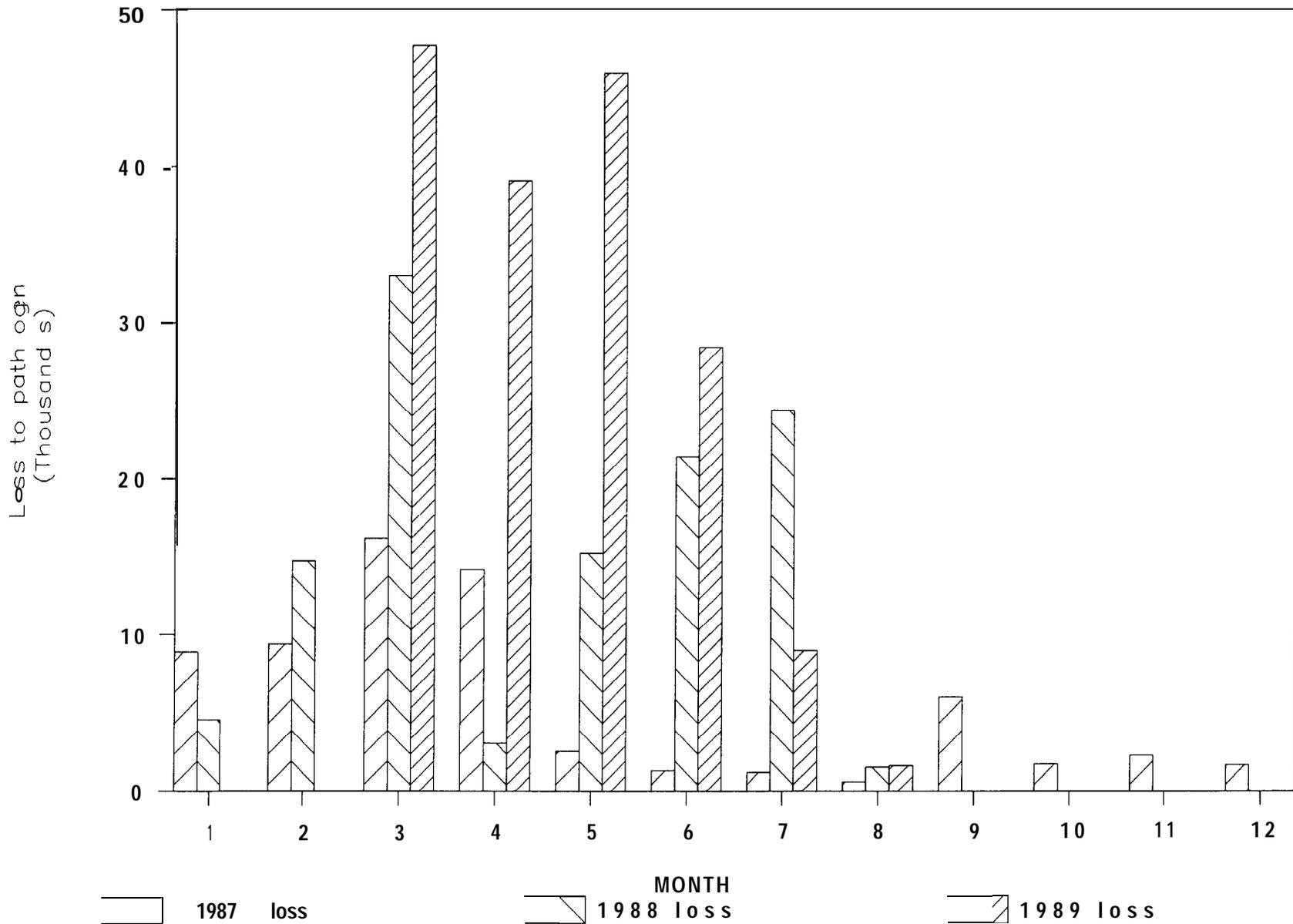


Figure 2. Juvenile loss to Coldwater Disease at WDF Lower Columbia Basin Hatcheries; 1987, 1988 & 1989.

# Juvenile Loss to CWD Upper Columbia

WDF hatcheries



12A

Figure 3. Juvenile loss to Coldwater Disease at WDF Upper Columbia Basin Hatcheries; 1987, 1988 & 1989.

## Juvenile Loss to BKD Upper Columbia

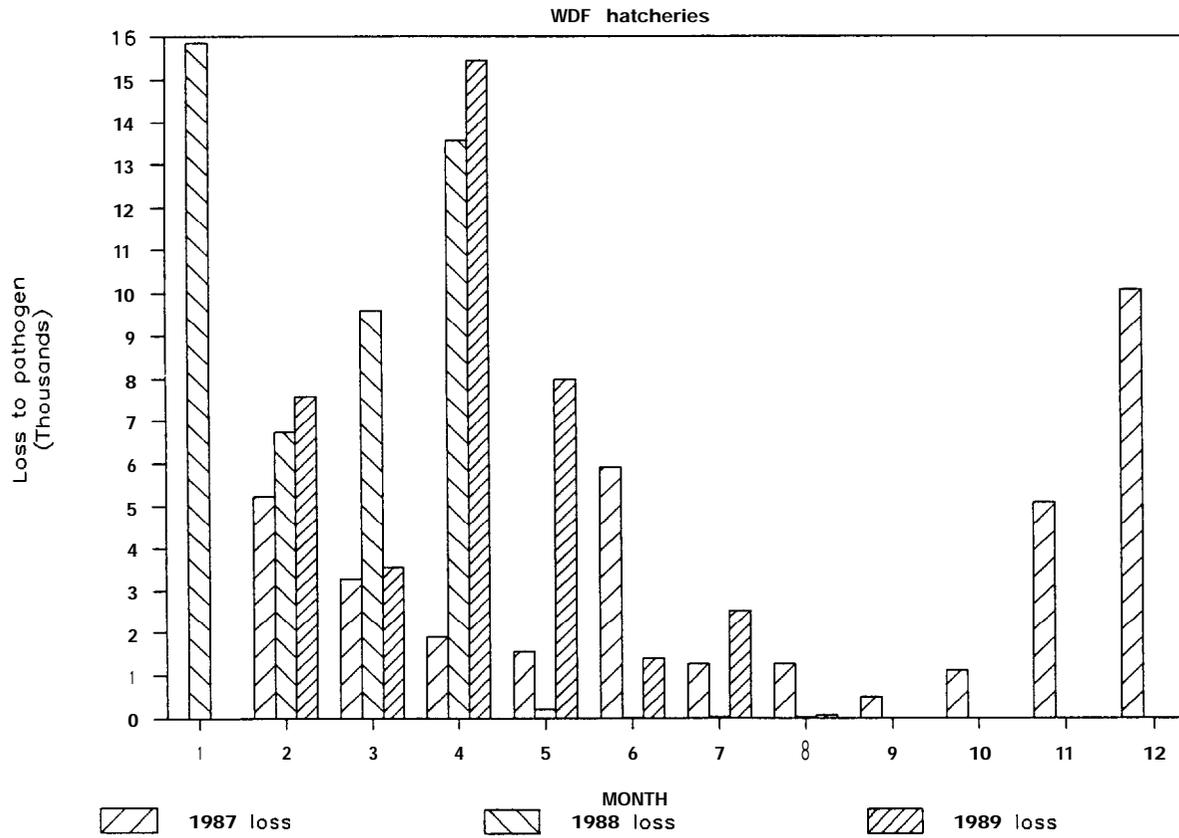


Figure 4. Juvenile loss to Bacterial Kidney Disease at WDF Upper Columbia Basin Hatcheries.

Table 5. Pre-Release Sampling Results - Yearling Age Releases 1987, 1988 and 1989.

Species	Stock	Brood Year	IHNY		IPNY		EIBS		BKD			
			# Fish	Result	# Fish	Result	# Fish	Percent Positive	# Fish	Percent Positive		
Hatchery: Cowlitz				N								
Spt-ing	cowlitz	85	60	N	60	N	59	56	95	60	44	73
Spring	Cowlitz	86	60		60	N	60			60	16	27
Spring	cow				60			1	2			5
L. cot-lo	cowlitz	87	60	N	60	N	60	52	87	60	3	2
L. coho	cowlitz	86	60	N	60	N	60	0	0	60	5	8
L. coho	cowlitz	87	65	N	65	N	60	13	22	60	3	5
Hatchery: Elokomin												
L. Coho	Elokomin	85	60	N	60	N	60	7	12	60	16	27
L. Coho	Elokomin	86	60	N	60	N	60	0	0	60	5	8
L. Cot-u	Elokomin	87	60	N	60	N	60	10	17	60	3	5
Hatchery: Grays River												
E. Coho	Grays River	85	60	N	60	N	60	51	85	62	0	0
E. Coho	Grays River	86	60	N	60	N	60	0	0	60	7	12
E. Coho	Grays River	87	60	N	60	N	60	0	0	60	4	7
Hatchery: Kalama Falls												
L. Coho	Kalama Falls	85	60	N	60	N	60	42	70	60	20	33
L. Coho	Kalama Falls	86	60	N	60	N	60	4	7	60	10	17
L. Coho	Kalama Falls	87	69	N	69	N	60	18	30	58	0	0
Spring	Kalama Falls	86	60	N	60	N	60	0	0	60	0	0
Spring	Kalama Falls	87	60	N	60	N	60	0	0	60	9	15
Hatchery: Klickitat												
Spring	Klickitat	85	60	N	60	N	60	49	82	60	0	0
Spring	Klickitat	86	60	N	60	N	60	0	0	60	31	52
Spriting	Klickitat	87	60	N	60	N	60	7	12	60	6	10
L. Coho	Klickitat	85	60	N	60	N	60	60	100	60	1	2
L. Coho	Klickitat	86	60	N	60	N	60	1	2	60	48	80
L. Coho	Klickitat	87	60	N	60	N	60	0	0	60	2	3
Hatchery Lewis River												
Spring	Lewis River	85	60	N	60	N	60	60	100	60	34	57
Spring	Lewis River	86	60	P	60	N	60	0	0	60	22	37
Spring	Lewis River	87	62	N	62	N	62	20	32	60	1	2
L. Coho	Lewis River	85	60	N	60	N	60	51	85	60	48	80
E&L Coho	Lewis River	86	60	N	60	N	60	20	33	60	37	62
E&L Coho	Lewis River	87	67	N	67	N	60	0	0	60	3	5

Result: N = negative P = positive for species and stock # = # positive

Table 5. Pre--Release Sampling Results - Yearling Age Releases 1987, 1988 and 1989.

Species Stock	Brood Year	IHW		IPNV		EIBS		Percent Positive	BKD		Percent Positive		
		# Fish	Result	# Fish	Result	# Fish	Result		# Fish	Result			
<b>Hatchery: Lower Kalama</b>													
E. Coho Lower Kalama	85	60	N	60	N	60	60	45	0	75	60	23	38
E. Coho Kalarna Fal is	86	60	N	60	N	60	60	0	0	0	60	40	67
E. Coho Lower Kalama	87	60	N	60	N	60	60	1	2	2	60	1	2
<b>Hatchery: Lyons Ferry</b>													
Fall Lyons Ferry		60	N	60	N	60	60	52	87	87	60	45	75
Fall Lyons Ferry	86	60	N	60	N	60	60	0	0	0	60	20	33
Fall Lyons Ferry	87	69	N	69	N	60	60	0	0	0	60	5	8
<b>Hatchery: Ringold</b>													
Fall Ringold	85	60	N	60	N	60	60	54	90	90	60	48	80
Spring Ringold	86	60	N	60	N	60	60	0	0	0	60	6	10
<b>Hatchery: Rocky Reach</b>													
Fall Priest	85	60	N	60	N	59	59	37	63	63	60	0	0
Fall Rocky Reach	86	60	N	60	N	60	60	0	7	7	60	37	62
Fall Rocky Reach	87	60	N	60	N	60	60	0	0	0	60	0	0
L. Coho Rocky Reach		60	N	60	N	60	60	0	0	0	60	1	2
E. Coho Rocky Reach	85	60	N	60	N	60	60	10	17	17	60	28	47
E. Coho Rocky Reach	86	60	N	60	N	60	60	0	0	0	60	0	0
<b>Hatchery: Speelyai</b>													
Spring Speelyai	86	60	N	60	N	60	60	0	0	0	60	20	33
<b>Hatchery: Toutle</b>													
E. Coho Toutle		60	N	60	N	60	60	1	2	2	60	37	62
E. Coho Toutle	86	60	N	62	N	60	60	0	0	0	60	0	0
<b>Hatchery: Tucannon</b>													
Spring Tucannon	85	30	N	30	N	30	30	28	93	93	30	21	70
Spring Tucannon	86	60	N	60	N	60	60	4	7	7	60	13	22
Spring Tucannon	87	60	N	60	N	60	60	31	52	52	60	2	3
<b>Hatchery: Washougal</b>													
E. Coho Washougal	85	60	N	60	N	60	60	33	55	55	60	0	0
L. Coho Washougal	85	60	N	60	N	59	59	54	92	92	60	0	0
L. Coho Washougal	86	60	N	60	N	60	60	0	0	0	60	0	0
L. Coho Washougal	87	60	N	60	N	60	60	20	33	33	60	3	5
<b>Hatchery: Wells Spawning Chanel</b>													
Summer Wells	85	60	N	60	N	60	60	16	27	27	60	1	2
Summer Wells	86	60	N	60	N	60	60	0	0	0	60	31	52
Summer Wells	87	60	N	60	N	60	60	1	2	2	60	3	5

Result: N = negative P = positive for species and stock # = # positive

Table 6. Pre-Release Sampling Results - Zero Age Releases, 1987, 1988 and 1989.

Species Stock	Brood Year	IHN		IPNV		EIBS			BKO			Comments
		# Fish	Result	# Fish	Result	# Fish	Result	Percent Positive	# Fish	Result	Percent positive	
Hatchery: Cowlitz												
Spring Cowlitz	86	60	N	60	N	60	28	47	60	19	32	
Spring Cowlitz	87	60	N	60	N	60	0	0	60	4	7	
Spring Cowlitz	88	65	N	65	N	60	0	0	60	2	3	
Fall Cowlitz	86	60	N	60	N	60	18	30	60	5	8	
Fall Cowlitz	87	60	N	60	N	60	0	0	60	39	65	
Fall Cowlitz	88	60	N	60	N	60	0	0	60	0	0	
Fall Cowlitz	86	60	N	60	N	60	32	53	60	1	2	Oelayed release
Fall Cowlitz	87	60	N	60	N	60	15	25	60	0	0	Oelayed release
Hatchery: Elokomin												
Fall Elokomin	86	60	N	60	N	60	29	48	60	0	0	
Fall Elokomin	87	60	N	60	N	60	0	0	60	57	95	
Fall Elokomin	88	60	N	60	N	60	1	2	60	0	0	
Hatchery: Grays River												
Fall Grays River	86	60	N	60	N	60	24	40	60	0	0	
Fall Grays River	87	60	N	60	N	60	0	0	60	2	3	
Fall Grays River	88	64	N	64	N	60	0	0	60	2	3	
Fall Grays River	86	57	N	57	N	56	37	66	57	0	0	Oelayed release
No delayed release in 1988 & 1989.												
Hatchery: Kalama Falls												
Fall Kalama Falls	86	60	N	60	N	60	25	42	60	0	0	
Fall Kalama Falls	87	60	N	60	N	60	0	0	60	20	33	
Fall Kalama Falls	88	65	N	65	N	60	0	0	60	6	10	
Hatchery: Klickitat												
Fall priest Rapids	86	60	N	60	N	60	19	32	60	3	5	
Fall priest Rapids	86	60	N	60	N	60	32	53	60	0	0	Oelayed release
Fall Klickitat	86	60	N	60	N	60	19	32	60	0	0	
Fall Klickitat	87	60	N	60	N	60	0	0	60	9	15	
Fall Klickitat	88	62	N	62	N	60	0	0	60	0	0	
Spring Klickitat	87	60	N	60	N	60	1	2	60	8	13	
Hatchery: Lower Kalama												
Fall Lower Kalama	86	60	N	60	N	60	28	46	60	2	3	
Fall Lower Kalama	87	60	N	60	N	60	0	0	60	34	57	
Fall Lower Kalama	88	65	N	65	N	60	0	0	60	1	2	

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Result: N = negative P = positive # = # positive

Table 6. Pre-Release Sampling Results - Zero Age Releases, 1987, 1988 and 1989.

Species	Stock	Brood Year	IHN		IPNV		EIBS		8KD		Comments	
			# Fish	Result	# Fish	Result	# Fish	Percent Positive	# Fish	Percent Positive		
Hatchery: Lyons Ferry												
Fall	Lyons Ferry	86	60	N	60	N	60	38	63	60	0	0
Fall	Lyons Ferry	87	60	N	60	N	60	0	0	60	22	37
Fall	Lyons Ferry	88	65	N	65	N	60	0	0	60	0	0
Hatchery: Priest Rapids												
Fall	Priest Rapids	86	60	N	60	N	60	25	42	60	0	0
Fall	Priest Rapids	87	60	N	60	N	60	0	0	60	13	22
Fall	Priest Rapids	88	60	N	60	N	60	0	0	60	0	0
Hatchery: Rocky Reach												
Fall	Rocky Reach	86	60	N	60	N	60	24	40	60	0	0
No zero release in 1988 & 1989												
Hatchery: Toutle												
Fall	Toutle	87	60	N	60	N	60	0	0	60	10	17
Fall	Toutle	88	60	N	60	N	60	0	0	60	1	2
Hatchery: Washougal												
Fall	Washougal	86	60	N	60	N	60	24	40	60	20	33
Fall	Washougal	87	60	N	60	N	60	0	0	60	22	37
Fall	Washougal	88	60	N	60	N	60	0	0	60	0	0
Hatchery: Wells Spawning Channel												
Summer	Wells	86	60	N	60	N	60	51	85	60	0	0
Summer	Wells	87	60	N	60	N	60	20	33	60	12	20
Summer	Wells	88	60	N	60	N	60	0	0	60	3	5
Summer	Wells	86	60	N	60	N	60	38	63	60	1	2
No delayed release in 1988 & 1989.												

Result: N = negative P = positive # = # positive

all release groups since 1987. That data has been summarized by species for yearling and subyearling "zero" age releases (Appendix C). The raw data for 1989 is also presented in Appendix C. A brief summary by species and release age of mean hematocrit and mean hematocrit range are presented in Table 7.

Table 7. Mean hematocrit and Mean Hematocrit Range by species and release age, 1987, 1988 and 1989 sampling.			
Species	Age	Mean Hematocrit	Mean Hematocrit Range
Spring chinook	yearling	36.0	31.1 - 43.4
Fall chinook	yearling	41.0	38.4 - 43.7
Summer chinook	yearling	35.1	34.2 - 36.4
Late coho	yearling	34.1	27.4 - 41.6
Early coho	yearling	32.4	27.1 - 39.6
Fall chinook	zero	35.7	29.2 - 42.6

#### Midterm Exams

Results of midterm BKD and Myxobolus cerebralis exams are presented in Table 8. The 1988 brood examined mid rearing in 1989 had a 4.9% prevalence of BKD, slightly lower than the 6.8% found in 1988. All assays for M. cerebralis were negative.

#### Organosomatic Analysis- Index Stocks

The Organosomatic Index (OSI) analysis, developed by Ron Goede of the Utah Division of Wildlife Resources, was performed on 60 fish from each of the index stocks listed in Table 9. Organosomatic index analyses have been conducted on index stocks for three consecutive years with the exception of Lewis River early coho. This stock has been examined using OSI analysis for two consecutive years after having been selected as an index stock in 1988 to replace the Lower Xalama early coho. Also, the Cowlitz fall chinook yearling stock was removed from this year's list of index stocks because there was no such release this year. No OSI analysis was performed on the Cowlitz fall chinook delayed release subyearling stock this year because the stock was released within 90 days of OSI analysis of normal release stock. Summaries of OSI analyses follow, highlighting similarities and differences between subsequent year classes. Computer generated summaries and raw data are listed in Appendix D.

Table 8. Midterm Sampling Results, 1987, 1988 and 1989.

Stock	Year	# Fish	BKD		# Fish	M.c. Result
			Result	Percent Positive		
<b>Hatchery: Cowlitz</b>						
Spring	86	60	0	0	72	N
Spring	87	60	6	10	60	N
Spring	88	60	1	2	NS	
L. Coho	86	60	1	2	--	
L. Coho	87	60	1	2	--	
L. Coho	88	60	2	3	--	
<b>Hatchery: Elokomín</b>						
L. Coho	86	60	0	0	--	
L. Coho	87	60	0	0	--	
L. Coho	88	60	2	3	--	
E. Coho	87	60	0	0	--	
E. Coho	88	60	7	12	--	-
Fall	88	--			60	N
<b>Hatchery: Grays River</b>						
Fall	86	--			57	N
Fall	88	--			60	N
E. Coho	86	60	0	0	--	
E. Coho	88	60	0	0	--	
<b>Hatchery: Kalama Falls</b>						
Spring	86	60	0	0	60	N
Spring	87	60	2	3	60	N
Spring	88	40	0		60	N
L. Coho	86	60	0	8	--	
L. Coho	87	60	2	3	--	
L. Coho	88	60	2	3	--	
<b>Hatchery: Klickitat</b>						
Spring	86	60	0	0	60	N
Spring	87	60	7	12	--	
Spring	88	60	8	13	--	
L. Coho	86	60	0	0	--	
L. Coho	87	60	9	15	--	
L. Coho	88	15	1	7	--	
<b>Hatchery: Lewis River</b>						
Spring	86	60	0	0	60	N
Spring	87	60	2	3	60	N
L. Coho	86	60			--	
L. Coho	87	60	8	8	--	
L. Coho	88	60	0	0	--	
<b>Hatchery: Lower Kalama</b>						
E. Coho	86	60	0	0	--	
E. Coho	88	60	3	5	--	
<b>Hatchery: Lyons Ferry</b>						
Fall	86	60	0	0	--	
Fall	87	60	6	10	--	
Fall	88	60	0	0	--	
<b>Hatchery: Priest Rapids</b>						
Fall	87	--			60	N
Fall	88	--			60	N
<b>Hatchery: Ringold</b>						
Spring	86		0	0	60	N
Spring	88	510	11	35	NC	NC
<b>Hatchery: Rocky Reach</b>						
Fall	86	60	0	0	60	N
Fall	87	60	0	0	60	N
Fall	88	60	0		--	
E. Coho	86	60	0	8	--	
E. Coho	87	60	2	3	--	
L. Coho	88	60	0	0	--	

M.c. = Myxobolus cerebralis      NC = Not Completed  
 Result: N = negative P = positive for species & stock # = # positive

Table 8. Midterm Sampling Results, 1987, 1988 and 1989.

Species	Stock	Brood Year	BKD		Percent Positive	# Fish	M.c. Result
			# Fish	Result			
<b>Hatchery: Speelyai</b>							
Spring	Speelyai	86	60	0	0	60	N
Spring	Speelyai	88	60	3	5	NC	NC
E. Coho	Lewis River	86	60	0	0	--	
E. Coho	Speelyai	87	60	2	3	--	
E. Coho	Speelyai	88	60	1	2	--	
<b>Hatchery: Tucannon</b>							
Spring	Tucannon	86	60	1	2	60	N
Spring	Tucannon	87	60	29	48	60	N
Spring	Tucannon	88	NS	NS	NS	--	-
Spring	Tucannon-wild	87	NS	NS	NS	20	N
<b>Hatchery: Washougal</b>							
L. Coho	Washougal	86	60	0	0	--	
L. Coho	Washougal	87	60	0	0	--	
L. Coho	Washougal	88	60	12	20	--	
E. Coho	Kalama Falls	87	60	2	3	--	-
Fall	washougal	87	--	-	-	60	N
Fall	Washougal	88	--	-	-	60	N
<b>Hatchery: Wells Spawning Channel</b>							
Summer	Wells	87	60	3	0	60	N
Summer	Wells	88	60	0	5	--	
Summer					0	--	

M.c = Myxobolus cerebralis      NC = Not Completed.  
 Result: N = negative   P = positive for species & stock   # = # positive

Hatchery	Stock	Year Class
Cowlitz	Spring chinook	Yearling and subyearling.
Cowlitz	Fall Chinook (Tule)	Subyearling.
Lyons Ferry	Fall Chinook (URB)	Yearling and subyearling.
Lewis River	Early Coho	Yearling.

Cowlitz spring chinook yearlings 1987 brood

The brood year (BY) 1987 Cowlitz yearling lot, released in 1989, exhibited improved health as reflected in the results of OS1 analyses. A marked decrease in occurrence of abnormal pseudobranchs, pale gills, enlarged spleens and swollen kidneys is shown by comparisons to health of 1986 and 1987 releases, however, a large increase in prevalence of hemorrhaged thymus is also indicated (Table 10). Stress often brings about swelling or hemorrhaging in the thymus or pseudobranch, and is therefore expected in a small percentage of hatchery reared fish. On the other hand, the level seen here is unusually high and may be due to some other stressor such as a pathogen. Fat levels of 0 (2%), +1 (Normal or desirable level; 52%) and +2 (45%) were observed in the fish sampled. It is interesting to note that 72% of the fish sampled were males.

Table 10. Comparison of observed tissue abnormalities at Cowlitz hatchery, yearling spring chinook releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
1985	1987	10%	0%	7%	40%	2%
1986	1988	27%	23%	7%	2%	5%
1987	1989	38%	0%	0%	2%	0%

Cowlitz spring chinook subyearlings 1988 brood

The BY88 Cowlitz spring chinook subyearling lot, released in 1989, appeared healthy with the exception of enlarged spleens in 10% of the fish sampled. By comparison, 2% of the subyearling lot released in 1988, and 13% of the lot released in 1987, had enlarged spleens (Table 11). Levels of EIBS and BKD decreased with respect to previous years' data. Two of 60 tissue smears tested positive for BKD, but at levels of less than 10 bacteria per 30 fields. Fat levels of 0 (10%) and +1 (90%) were observed in the fish sampled.

Table 11. Comparison of observed tissue abnormalities at Cowlitz hatchery, subyearling spring chinook releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
1985	1987	2%	3%	0%	13%	0%
1986	1988	3%	2%	0%	2%	0%
1987	1989	0%	2%	2%	10%	0%

Cowlitz fall chinook subyearlings 1988 brood

The BY88 Cowlitz fall chinook subyearling lot, released in 1989, exhibited a slight increase in percentage of hemorrhaged thymus and swollen pseudobranchs as compared to the health of subyearling releases in 1987 and 1988 (Table 12). A slight reduction in percentage of pale gills and enlarged spleens was observed. Prevalence of both EIBS and BKD dropped to 0%. Fat levels of 0 (7%), +1 (82%), and +2 (12%) were observed in the fish sampled.

Table 12. Comparison of observed tissue abnormalities at Cowlitz hatchery, subyearling fall chinook releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
			0%	2%	5%	0%
1986	1988	8%	0%	0%	2%	0%
			2%	0%	0%	0%

Lyons Ferry fall chinook yearlings 1987 brood

The BY87 Lyons Ferry fall chinook yearling lot, released in 1989, exhibited abnormalities of the thymus, pseudobranch spleen and kidney. Comparisons the 1986 and 1987 releases indicate a marked decrease in the prevalence of hemorrhaged thymus, and slight increases in observation of swollen pseudobranchs, enlarged spleens and swollen kidneys (Table 13). Blood films tested negative for EIBS, and 5 of 60 kidney smears tested positive for BKD. Fat levels of 0 (10%), +1 (63%), and +2 (27%) were observed in the fish sampled. It is interesting to note that 67% of the fish sampled were males.

Table 13. Comparison of observed tissue abnormalities at Lyons Ferry hatchery, yearling fall chinook releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
1985	1987	18%	7%	0%	0%	0%
1986	1988	47%	0%	0%	5%	0%
1987	1989	9%	12%	0%	17%	5%

Lyons Ferry fall chinook subyearlings 1988 brood

The BY88 Lyons Ferry fall chinook subyearling lot, released in 1989, appeared very healthy. Gross observation of internal organs revealed no abnormalities. Tissue smears tested negative for both EIBS and BKD. Fat levels of +1 (47%) and +2 (53%) were observed in the fish sampled. Comparisons of OSI analyses for consecutive year classes of this stock show consistently healthy fish (Table 14).

Table 14. Comparison of observed tissue abnormalities at Lyons Ferry hatchery, subyearling fall chinook releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
1985	1987	10%	0%	0%	0%	0%
1986	1988	0%	3%	0%	0%	0%
1987	1989	0%	0%	0%	0%	0%

Lewis River early coho yearlings 1987 brood

The BY87 Lewis River early coho yearling lot, released in 1989, exhibited no abnormalities upon gross observation of internal organs. Comparisons to the 1988 (BY86) release indicate a marked decrease in the observation of abnormal thymus and enlarged spleens and reduced detection of EIBS and BKD (Table 15). Tissue smears tested negative for EIBS, but 3 of 60 tissue smears tested positive for low levels of BKD. Fat levels of +1 (12%), +2 (75%), and +3 (13%) were observed in the fish sampled.

Table 15. Comparison of observed tissue abnormalities at Lewis River hatchery, yearling coho releases.

Brood Year	Release Year	Hemorrhaged Thymus	Abnormal Pseudobranch	Pale Gill	Enlarged Spleen	Swollen Kidney
1986	1988	3%	0%	0%	8%	0%
1987	1989 (E&L)	0%	0%	0%	0%	0%
1987	1989 (E.)	0%	0%	0%	0%	0%
1987	1989 (L.)	0%	0%	0%	0%	0%

## SPECIAL PROJECTS

### Erythrocytic Inclusion Body Syndrome (EIBS)

Beginning in 1988 BPA provided funding for WDF to investigate the presence of viral particles in association with cytoplasmic inclusion bodies observed in blood films. WDF in cooperation with Charlie Smith, Beth MacConnell (USFWS Fish Technology Center Bozeman, MT) and Andy Blixt (Montana State University, Bozeman, MT) analyzed blood samples with electron microscopy for the presence of viral particles. Results have shown that nearly all typical erythrocytic cytoplasmic inclusions were of viral origin. Samples that had atypical dense staining inclusions by light microscopy had inclusions by electron microscopy that appeared to be membrane bound material.

### SUMMARY AND CONCLUSIONS

With the completion of three years of sampling and data collection we are continuing to see benefits from this project. In 1990 we will evaluate each component of the project for its overall value to fish health management within WDF. Benefits we have already identified include, but are not limited to the following. Monthly monitoring exam structure for consistent evaluation of specific fish pathogens. Evaluation of juvenile health at midterm and release. This provides information for Agency personnel about the release condition that may be reflected in future contributions. Adult monitoring and testing has allowed WDF to determine the cause of pre-spawning mortality and possible preventative treatments or holding strategies to reduce pre-spawn loss. Pathogen screening and better documentation of adult treatments will allow us to begin (in 1990) to make correlations to pathogen prevalence in progeny. Computerization of fish health and hatchery rearing data has provided WDF with an efficient and practical means of managing, compiling and analyzing the large database that is being developed by this project. The project has allowed WDF to provide other management agencies (USFWS, Fish Passage Center and Water Budget) with fish health data consistent in methodology with all other Agencies involved in this project. The project has also allowed for the development of new techniques for pathogen detection, training of staff in the state of the art detection methods and field application of these techniques. Field sampling methodology development has occurred because of the demands of the BPA project. These methods/techniques have been applied at other WDF hatcheries to enhance our disease detection abilities.

Technology benefits from this BPA project:

- Ovarian fluid BKD detection methods.
- Application of fluorescent antibody lab technique.
- Use of acridine orange technique.
- EIBS staining technique and inclusion identification.

- Juvenile field sampling techniques.

With funding provided by BPA WDF has developed a highly trained, proficient staff that is able to apply the information gained on the BPA project to statewide WDF facilities.

Literature Cited

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Appendix A. Adult Contribution of Index Station Stocks.

Hatchery: Cowlitz

	Tag Code	%						
<u>Soecies</u>	<u>Brood '82</u>	<u>Survival</u>	<u>Brood '83</u>	<u>Survival</u>	<u>Brood '84</u>	<u>Survival</u>	<u>Brood '85</u>	<u>Survival</u>
Spring	63 28/34	1.41	63 27/48	4.80	63 34/37	<b>1.19</b>	63 38/33	1.56
	63 28/35	1.04	63 27/47	4.74	63 35/5	<b>1.18</b>	63 38/34	1.30
	63 28/36	.89	63 30/54	3.20	63 35/6	<b>1.49</b>	63 38/35	<b>1.09</b>
			63 30/55	2.90	63 35/7	<b>1.86</b>		
			63 30/56	5.77	63 35/8	<b>1.68</b>		
			63 31/22	6.98	63 35/9	<b>1.75</b>		
					63 35/10	<b>1.48</b>		
					63 35/11	<b>1.86</b>		
					63 35/12	<b>1.67</b>		
Fall	63 25/3	.34	63 <b>30/19</b>	.73	63 32/35	.70	63 41/8R4	<b>.10</b>
	63 26/10	.04	63 30/20	.94	63 32/36	.84		
			63 31/24	.69	63 32/37	.72		
			63 31/25	.80	63 32/38	.85		
Fall (Delayed)			63 23/27	.73	63 34/48	1.36		
			63 23/28	.71	63 34/49	1.18		
					63 34/50	2.24		
					63 34/51	2.32		

Hatchery: Cowlitz

	Tag Code	%	Tag Code	%	Tag Code	%
<u>Soecies</u>	<u>Brood '86</u>	<u>Survival</u>	<u>Brood '87</u>	<u>Survival</u>	<u>Brood '88</u>	<u>Survival</u>
Spring	63 41/61R3	NA	63 42/4R3	NA		
Fall	63 41/26R4	NA	63 52/31R4	NA	63 52/50R4	NA

Appendix A. Adult Contribution of Index Station Stocks.

Hatchery: Speel yai

Species	Tag	Code	%	Tag	Code	%	Tag	Code	%	Tag	Code	%
	Brood	'82	Survival	Brood	'85	Survival	Brood	'86	Survival	Brood	'87	Survival
Early	63	30/15	.16	63	37/1	5.31	63	44/50R3	NA	63	52/56	NA
Coho	63	30/16	.58	63	37/2	5.16						
				63	36/63	4.75						

Hatchery: Speel yai

Species	Tag	Code	%
	Brood	'88	Survival
Early	63	1/44R3	NA
Coho	63	1/47	NA

Hatchery: Lyons Ferry

Species	Tag	Code	%	Tag	Code	%	Tag	Code	%	Tag	Code	%
	Brood	'83	Survival	Brood	'84	Survival	Brood	'85	Survival	Brood	'86	Survival
Fall	63	21/52	6.84	63	28/41	.68	63	36/38	.22	63	42/59R6	.08
	63	32/18	7.32	63	32/26	.65	63	36/39	.14	63	42/61R6	.10
				63	32/27	.62	63	36/40	.12	63	42/62R6	.22
				63	32/28	.57	63	36/41	.12	63	44/1R6	.18
							63	36/42	.13	63	44/11R6	.20
							63	41/56R3	1.44	63	44/13R6	.25
							63	41/59R3	1.41			
Fall							63	36/33	.13	63	44/7R6	.30
(Barged)							63	36134	.11	63	44/8R6	.24
							63	36135	.08			
							63	36/36	.07			
							63	36/37	.11			

Hatchery: Lyons Ferry

Species	Tag Code		%	Tag Code		%
	Brood '87	Survival		Brood '88	Survival	
Fall	63	52/14R6	NA	63	2/26R6	NA
	63	52/16R6	NA	63	2/28R6	NA
				63	2/35R6	NA
				63	2/37R6	NA
Fall (Barged)	63	52/11R6	NA	63	52/4R6	NA
	63	52/13R6	NA	63	52/7R6	NA

## APPENDIX B

Appendix B contains the Disease Prevalence Summary Report for calendar year 1989. Pathogens and causes of loss are categorized by: Bacterial, Other, Parasite and Viral. Loss to each pathogen or cause is totaled per month with Lower Columbia (LCol) and Upper Columbia (UCol) stations divided.

### Abbreviations:

BHS - Bacterial Hemorrhagic Septicemia

EIBS - Erythrocytic Inclusion Body Syndrome

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WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Bacteriai  
Agent: Bacterial Gill Dis

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flou Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: June	1989								
	Kalama Falls	Fall Chinook	Kalama Falls	88	123.	0.619	0.065	11215	4.57
	Lower Kalama	FaLL Chinook	Kalama Falls	88	70.	1.584	0.095	1400	0.06
								-----	
								12615	
UC01									
Month: March	1989								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	248.	0.659	0.1648	466	0.02
								-----	
								466	
Month: April	1989								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	172.	0.591	0.1838	45207	1.67
								-----	
								45207	
Month: May	1989								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	100.	0.497	0.1847	48516	2.06

Disease Category: Bacterial  
Agent: BHS

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: March	1989								
	Speelyai	Spring Chinook	Leuis River	88	248.	1.524	0.0871	792	0.08
								-----	
								792	
Month: April	1989								
	Speelyai	Spring Chinook	Leuis River	88	211.	1.131	0.0916	5670	0.61
								-----	
								5670	
Month: May	1989								
	Elokomin	Fall Chinook	Elokomin	88	60.	2.276	0.1622	9300	0.26
	Speelyai	Spring Chinook	Levis River	88	186.	0.873	0.0623	1000	0.1
								-----	
								10300	
Month: June	1989								
	Louer Kalama	Fall Chinook	Kalama Falls	88	70.	1.584	0.095	1400	0.06
								-----	
								1400-	

WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Bacterial  
Agent: Bacterial Kidney Dis

Basin	Location	Species	stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
-----									
LCoL									
Month: March	1989 Coulitz Lewis River	Spring Chinook Early Coho	Coulitz Lewis River	87 87	7.3 22.	0.701 1.666	0.0088 0.1249	2400 23 em----- 2423	0.37 E-3
Month: October	1989 Cowlits Lewis River	Spring Chinook Spring Chinook	Coulitz Kalama Falls	88 88	18. 32.	0.537 0.201	0.0772 0.0135	2525 105 me----- 2630	0.23 0.07
Month: November	1989 Levis River Levis River	Spring Chinook Spring Chinook	Kalama Falls Lewis River	88 88	23. 23.	0.239 0.599	0.016 0.0539	323 144 ---mm--- 467	0.23 0.07
UCoL									
Month: January	1989 Wells Spawning	Spring Chinook	Leavenuorth	88	75.	2.201	0.4952	1 ----- 1	E-3
Month: February	1989 Klickitat Ringold	Spring Chinook Spring Chinook	Klickitat Klickitat	87 88	10. 258.	1.792 0.498	0.1311 0.091	900 6683 ----- 7583	0.13 0.56
Month: March	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	87	11.	0.607	0.0778	3552 ----- 3552	0.85
Month: April	1989 Lyon's Ferry Wells Spawning	Fall Chinook Summer Chinook	Lyon's Ferry Wells	87 88	10. 125.	0.672 1.343	0.0861 0.2183	5102 10340 ----- 15442	1.24 0.4
Month: May	1989 Klickitat Wells Spawning	Late Coho Summer Chinook	Lewis River Wells	a7 88	19. 120.	0.655 1.036	0.0368 0.0788	5080 2880 m--e---- 7960	1.71 0.35
Month: June	1989 Wells Spawning	Sumner Chinook	Wells	88	50.	2.38	0.1812	1380 ----- 1380	0.17

WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Bacterial  
Agent: Bacterial Kidney Dis

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% LOSS
Month: July	1989 Klickitat Wells Spawning	Spring Chinook Summer Chinook	Klickitat Wells	88 a8	53. 35.	1.531 1.286	0.0501 0.164	214 2305	0.03 0.28
								----- 2519	
Month: August	1989 Klickitat Wells Spawning	Spring Chinook Summer Chinook	Klickitat Wells	88 88	42. 28.	1.645 1.361	0.0538 0.1085	76 7	E-2 E-3
								----- 83	
Month: December	1989 Lyon's Ferry Lyon's Ferry	Fall Chinook Spring Chinook	Lyon's Ferry Tucannon	A A	-0- -0-	-0- -0-	-0- -0-	20 8	1.06 8.7
								----- 28	

Disease Category: Bacterial  
Agent: Columnaries

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
UCol									
Month: June	1989 Priest Rapids	Fall Chinook	Priest Rapids	88	48.	0.876	0.2292	1430	0.03
								----- 1430	
Month: July	1989 Rocky Reach	Late Coho	Coutitz	88	125.	0.362	0.0426	23100	4.77
								----- 23100	
Month: August	1989 Rocky Reach	Late Coho	Cowlitz	88	90.	0.44	0.0518	3480	0.72
								----- 3480	
Month: September	1989 Rocky Reach	Late Coho	Cowlitz	88	67.	0.529	0.0623	2665	0.56
								----- 2665	
Month: December	1989 Priest Rapids	Fall Chinook	Priest Rapids	A	-0-	-0-	-0-	319	7.17
								----- 319	

MF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Bacterial  
Agent: Cold Water Disease

Basin	Location	Swc i es	stock	Brood	Sire Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: January	1989								
	Cowlitz	Late Coho	Cowlitz	87	30.	1.639	0.2087	10000	0.2
	Grays River	Early Coho	Big Creek	a7	26.	2.156	0.0503	49	0.01
	Grays River	Early Coho	Grays River	88	834.	1.412	0.0794	5509	0.36
	Grays River	Fall Chinook	Elokomin	88	492.	0.801	0.0601	4055	0.51
	Grays River	Fall Chinook	Grays River	88	751.	1.148	0.0753	3486	0.13
	Lewis River	Early Coho	Lewis River	87	28.	1.696	0.1131	99	E-2
	Leuis River	Late Coho	Leuis River	87	35.	2.534	0.1717	470	0.01
								-----	
								23668	
Month: February	1989								
	Cowlitz	Late Coho	Cowlitz	87	25.	2.017	0.2569	6960	0.14
	Elokomin	Late Coho	Elokomin	87	25.	1.595	0.1161	200	0.01
	Grays River	Early Coho	Big Creek	87	23.	2.315	0.054	13	E-3
	Grays River	Early Coho	Grays River	88	494.	1.498	0.0856	28712	1.91
	Grays River	Fall Chinook	Elokomin	88	400.	1.254	0.0941	513	0.06
	Lewis River	Early Coho	Leuis River	87	25.	1.852	0.1234	45	E-3
	Lewis River	Late Coho	Lewis River	87	32.	1.934	0.1251	603	0.01
	Lewis River	Spring Chinook	Lewis River	a7	10.	1.533	0.1029	79	0.02
	Lower Kalama	Early Coho	Kalama Falls	88	810.	0.609	0.0731	1654	0.19
	Speelyai	Early Coho	Lewis River	88	800.	1.509	0.0755	19475	1.05
	Washouga l	Fall Chinook	Washouga l	88	870.	1.392	0.5269	14322	0.28
								-----	
								72576	
Month: March	1989								
	Cowlitz	Late Coho	Cowlitz	87	21.	2.027	0.2582	50265	1.05
	Elokomin	Early Coho	Elokomin	88	400.	1.482	0.1144	1050	0.19
	Elokomin	Early Coho	Grays River	88	227.	1.032	0.0796	1620	0.31
	Elokomin	Early Coho	Kalama Falls	88	449.	2.575	0.1738	1288	0.24
	Grays River	Early Coho	Grays River	88	284.	0.862	0.0497	5200	0.69
	Grays River	Fall Chinook	Grays River	88	263.	1.066	0.0677	4035	0.29
	Kalama Falls	Late Coho	Kalama Falls	a7	20.	1.589	0.1676	2710	0.29
	Lewis River	Early Coho	Lewis River	87	22.	1.666	0.1249	14	E-3
	Lewis River	Late Coho	Lewis River	87	26.	2.03	0.1353	523	0.01
	Leuis River	Late Coho	Leuis River	88	1153.	1.296	0.0866	326	0.02
	Lewis River	Spring Chinook	Lewis River	87	8.	6.64	0.4455	29	E-2
	Louer Kalama	Early Coho	Kalama Falls	88	358.	0.686	0.0823	2087	0.37
	Speelyai	Early Coho	Lewis River	88	500.	0.684	0.0325	19760	1.22
	Washougal	Fall Chinook	Washouga l	88	437.	1.078	0.0269	283	E-2
								-----	
								89190	
Month: April	1989								
	Elokomin	Early Coho	Elokomin	88	231.	0.301	0.0878	4695	0.88
	Elokomin	Early Coho	Grays River	88	140.	1.332	0.1028	2475	0.47
	Elokomin	Late Coho	Elokomin	88	325.	1.825	0.1408	4020	0.35
	Grays River	Early Coho	Grays River	88	172.	0.993	0.0559	5976	0.81
	Kalama Falls	Late Coho	Kalama Falls	87	16.	1.815	0.1914	1550	0.16
	Lewis River	Early Coho	Lewis River	87	18.	1.894	0.1421	442	0.04
	Lewis River	Late Coho	Lewis River	87	20.	2.428	0.1619	1052	0.02
	Lewis River	Late Coho	Lewis River	88	837.	1.047	0.0856	7928	0.16
	Speelyai	Early Coho	Lewis River	88	167.	1.411	0.067	10000	0.62
	Washouga l	Late Coho	Washougal	87	19.	2.35	0.0752	1389	0.27
								-----	
								39527	

WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Bacterial  
Agent: Cold Water Disease

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
LCoL									
Month: May	1989								
	Cowlitz	Late Coho	Cowlitz	88	293.	0.816	0.1098	57150	0.71
	Elokomin	Early Coho	Elokomin	88	131.	0.637	0.0474	740	0.15
	Elokomin	Early Coho	Grays River	88	89.	1.195	0.088	410	0.08
	Elokomin	Late Coho	Elokomin	88	187.	0.537	0.0318	12860	1.12
	Grays River	Early Coho	Grays River	88	104.	1.103	0.0626	14957	2.07
	Kalama Falls	Late Coho	Kalama Falls	88	429.	1.177	0.1236	31125	3.17
	Lewis River	Late Coho	Lewis River	87	18.	2.092	0.1627	661	0.02
	Lewis River	Late Coho	Lewis River	88	377.	0.758	0.0853	63234	2.17
	Lower Kalama	Early Coho	Kalama Falls	88	96.	1.535	0.1843	3049	0.58
	Speelyai	Early Coho	Leuis River	88	129.	1.749	0.0889	10000	0.63
	Washougal	Late Coho	Leuis River	88	232.	2.116	0.0733	55018	1.71
	Washougal	Late Coho	Washouga 1	87	17.	0.251	0.008	75	0.15
	Washougal	Late Coho	Washougal	88	235.	1.821	0.0689	4324	1.73
								-----	
								253603	
Month: June	1989								
	Cowlitz	Late Coho	Cowlitz	88	160.	1.151	0.0984	3535	0.05
	Kalama falls	Late Coho	Kalama Falls	88	234.	0.749	0.062	750	0.08
	Lewis River	Late Coho	Levis River	88	240.	1.106	0.056	22173	0.96
	Washougal	Late Coho	Levis River	88	159.	1.187	0.0396	7740	0.32
								-----	
								34198	
Month: July	1989								
	Cowlitz	Late Coho	Cowlitz	88	85.	0.809	0.1213	25000	0.39
	Leuis R iver	Late Coho	Lewis River	88	190.	1.279	0.0648	1052	0.05
								-----	
								26052	
Month: August	1989								
	Cowlitz	Late Coho	Cowlitz	88	55.	1.356	0.1675	810	0.01
	Leuis River	Late Coho	Levis River	88	86.	2.171	0.1099	2019	0.09
								-----	
								2829	
Month: September	1989								
	Cowlitz	Fall Chinook	Cowlitz	88	14.	0.585	0.0709	4160	2.27
	Cowlitr	Spring Chinook	Cowlitz	88	20.	0.507	0.0676	5100	0.46
	Lewis River	Late Coho	Lewis River	88	92.	1.485	0.0924	3546	0.15
								-----	
								12806	
Month: October	1989								
	Lewis River	Early Coho	Lewis River	88	45.	0.249	0.005	233	0.3
	Lewis River	Late Coho	Lewis River	88	60.	1.474	0.0606	7090	0.31
	Lewis River	Spring Chinook	Kalama Falls	88	32.	0.201	0.0135	308	0.21
	Lewis River	Spring Chinook	Leuis River	88	30.	0.549	0.0481	270	0.14
								-----	
								7901	







WDF PROGRAM acoi  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: blank egg

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: December	1989								
	Lewis River	Early Coho	Levis River	89	-0-	-0-	-0-	386100	34.
	Lewis River	Late Coho	Lewis River	89	-0-	-0-	-0-	675600	10.2
	Lewis River	Late Coho	Lewis River	89	-0-	-0-	-0-	675600	10.3
								-----	
								1737300	

UCOL

Month: December	1989								
	Lyon's Ferry	Spring Chinook	Tucannon	89	-o-	-0-	-o-	13600	10.1
	Priest Rapids	Fall Chinook	Priest Rapids	88	-o-	-o-	-o-	691200	12.3
	Wells Spawning	Summer Chinook	Wells	89	-o-	-o-	-o-	260900	7 . 3
								-----	
								965700	

Disease Category: Other  
Agent: Botulism

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
UC01									
Month: November	1989								
	Ringold	Spring Chinook	Klickitat	88	12.	1.82	0.0046	35700	3.92
								-----	
								35700	





WDF PROGRAM Q001  
DISEASE PREVALENCE SUMMARY  
May 04, IWO

Disease Category: Other  
Agent: CWD/EIBS/FUNGUS

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flou Index	Density Index	Number LOSS	% Loss
LCoL									
Month: December	1989 Wells Spawning	Sumner Chinook	Wells	89	736.	0.766	0.0766	3365	1.4
								----- 3365	
Month: April	1989 Cowlitz	Late Coho	Coulitz	87	20.	2.213	0.2666	130300	2.81
								----- 130300	
Month: May	1989 Coulitz	Late Coho	Coulitz	87	16.	5.073	0.3171	50900	5.61
								----- 50900	
Month: September	1989 Coulitz	Late Coho	Coulitz	88	49.	1.477	0.1786	32640	0.67
								----- 32640	
Month: October	1989 Cowlitz	Late Coho	Coulitz	88	44.	1.555	0.188	44080	0.91
								----- 44080	
Month: November	1989 Coulitz	Late Coho	Coulitz	88	37.	1.733	0.2095	19520	0.41
								----- 19520	
Month: December	1989 Coulitz	Late Coho	Coulitz	88	33.	1.858	0.2246	25600	0.54
								----- 25600	
UCoL									
Month: August	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	51.	0.817	0.2722	1190	0.26
								----- 1190	



WDF PROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: destroy

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% LOSS
-----									
UC01									
Month: December	1989 Lyon's Ferry	Spring Chinook	Tucannon	89	-0-	-0-	-0-	5000	3.71
								-----	
								5000	

Disease Category: Other  
Agent: Predation

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% LOSS
-----									
LCoL									
Month: January	1989								
	Elokomin	Early Coho	Grays River	87	29.	1.249	0.0937	100	0.05
	Elokomin	Late Coho	Elokomin	87	26.	1.526	<b>0.1111</b>	500	0.03
	Grays River	Early Coho	gig Creek	87	26.	2.156	0.0503	119	0.03
	Kalama Falls	Fall Chinook	Kalama Falls	88	855.	0.751	0.0633	2550	0.08
	Kalama Falls	Late Coho	Kalama Falls	87	25.	1.146	0.1208	590	0.06
	Kalama Falls	Spring Chinook	Kalama Falls	88	685.	0.848	0.0679	795	0.11
								-----	
								4654	
Month: February	1989								
	Elokomin	Late Coho	Elokomin	87	25.	1.595	0.1161	670	0.04
	Grays River	Early Coho	Big Creek	87	23.	2.315	0.054	202	0.06
	Kalama Falls	Fall Chinook	Kalama Falls	88	657.	0.895	0.0843	1285	0.03
	Kalama Falls	Late Coho	Kalama Falls	87	23.	1.42	0.1498	70	E-2
	Kalama Falls	Spring Chinook	Kalama Falls	88	541.	0.805	0.0725	250	0.04
								-----	
								2477	
Month: March	1989								
	Elokomin	Late Coho	Elokomin	87	21.	1.453	0.1275	825	0.05
	Grays River	Early Coho	gig Creek	87	19.	2.648	0.0618	300	0.08
	Kalama Falls	Fall Chinook	Kalama Falls	88	329.	1.285	0.1488	790	<b>0.02</b>
	Kalama Falls	Late Coho	Kalama Falls	87	20.	1.589	0.1676	330	<b>0.03</b>
	Kalama Falls	Spring Chinook	Kalama Falls	88	335.	0.075	0.0091	560	<b>0.08</b>
								-----	
								2805	
Month: April	1989								
	Elokomin	Late Coho	Elokomin	87	17.	1.647	0.1445	685	0.04
	Kalama Falls	Fall Chinook	Kalama Falls	88	174.	0.821	0.0874	4275	0.12
	Kalama Falls	Late Coho	Kalama Falls	87	16.	1.815	0.1914	40	<b>E-3</b>
	Kalama Falls	Late Coho	Kalama Falls	88	659.	0.91	0.0955	2180	<b>0.21</b>
	Kalama Falls	Spring Chinook	Kalama Falls	88	206.	1.136	0.1363	860	0.12
								-----	
								8040	





WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Predation

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
UCoL									
Month: August	1989								
	Klickitat	Spring Chinook	Klickitat	88	42.	1.645	0.0538	400	0.05
	Ringold	Spring Chinook	Klickitat	88	25.	1.229	0.0035	9849	0.84
	Wells Spawning	Summer Chinook	Wells	88	28.	1.361	0.1085	54	0.01
								-----	
								10303	
Month: September	1989								
	Klickitat	Late Coho	Cowlitz	88	60.	1.667	0.1154	396	0.02
	Klickitat	Spring Chinook	Klickitat	88	40.	1.68	0.055	357	0.04
	Ringold	Spring Chinook	Klickitat	88	25.	1.214	0.0034	10000	0.86
	Wells Spawning	Summer Chinook	Wells	88	18.	1.782	0.142	205	0.05
								-----	
								10958	
								Page: 23	
Month: October	1989								
	Klickitat	Late Coho	Cowlitz	88	54.	1.709	0.0729	690	0.05
	Klickitat	Spring Chinook	Klickitat	88	37.	1.825	0.0572	348	0.04
	Ringold	Spring Chinook	Klickitat	88	20.	1.114	0.0031	50000	5.2
	Wells Spawning	Summer Chinook	Wells	88	16.	1.931	0.1538	166	0.04
								-----	
								51204	
Month: November	1989								
	Klickitat	Late Coho	Cowlitz	88	44.	2.168	0.0925	829	0.05
	Klickitat	Spring Chinook	Klickitat	88	37.	2.017	0.0632	470	0.06
	Ringold	Spring Chinook	Klickitat	88	12.	1.82	0.0046	15000	1.65
	Wells Spawning	Summer Chinook	Wells	88	13.	0.825	0.1788	202	0.05
								-----	
								16501	
Month: December	1989								
	Klickitat	Late Coho	Cowlitz	88	39.	4.6	0.1002	249	0.02
	Klickitat	Spring Chinook	Klickitat	88	30.	1.164	0.0729	425	0.05
	Klickitat	Spring Chinook	Klickitat	89	1233.	1.025	0.0448	966	0.1
	Klickitat	Spring Chinook	Wind River	89	1254.	0.875	0.0383	1976	0.16
	Ringold	Spring Chinook	Klickitat	88	10.	2.326	0.005	10000	1.11
	Wells Spawning	Summer Chinook	Wells	88	10.	0.977	0.2116	133	0.03
								-----	
								13749	

WDF PROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Eye picking

Basin	Location	Species	stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% LOSS
-----									
LCo1									
Month: March	1989 Grays River	Early Coho	Grays River	88	284.	0.862	0.0497	1661	0.22
								----- 1661	
Month: April	1989 Grays River	Early Coho	Grays River	88	172.	0.993	0.0559	3706	0.5
								---e-w-- 3706	
Month: May	1989 Grays River	Early Coho	Grays River	88	104.	1.103	0.0626	1159	0.16
								_--mm----- 1159	
Month: June	1989 Grays River	Fall Chinook	Grays River	88	50.	2.019	0.0742	227	0.02
								e-v----- 227	
UC01									
Month: January	1989 Lyon's Ferry Wells Spawning	Fall Chinook Summer Chinook	Lyon's Ferry Wells	87 87	18. 12.	0.462 1.228	0.0592 0.1527	473 51	0.11 0.01
								----- 524	
Month: February	1989 Lyon's Ferry Uells Spawning Wells Spawning	Fall Chinook Spring Chinook Summer Chinook	Lyon's Ferry Leavenworth Wells	87 88 87	14. 65. 11.	0.565 1.166 1.339	0.0678 0.2623 0.1665	477 5 54	0.11 E-3 0.01
								----- 536	
Month: March	1989 Lyon's Ferry Wells Spawning Wells Spawning	Fall Chinook Spring Chinook Summer Chinook	Lyon's Ferry Leavenuorth Uells	87 88 87	11. 45. 10.	0.607 0.714 1.463	0.0778 0.1607 0.1819	1017 16 60	0.24 E-2 0.01
								----- 1093	
Month: April	1989 Lyon's Ferry Wells Spawning Uells Spawning Uells Spawning	Fall Chinook Spring Chinook Summer Chinook Summer Chinook	Lyon's Ferry Leavenworth Uells Wells	87 88 87 88	10. 36. 9. 125.	0.672 0.908 1.553 1.343	0.0861 0.2042 0.1931 0.2183	254 1 105 518	0.06 E-3 0.02 0.02
								----- 878	

UDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Eye picking

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
UCoL									
Month: May	1989 Priest Rapids	Fall Chinook	Priest Rapids	88	73.	0.858	0.165	520 -----mm-- 520	E-2
Month: June	1989 Rocky Reach	Late Coho	Coulitr	88	187.	0.618	0.1351	200 ----- 200	0.04
Month: July	1989 wells Spawning	Summer Chinook	Wells	88	35.	1.286	0.164	232 ----- 232	0.03
Month: August	1989 Wells Spawning	Summer Chinook	Wells	88	28.	1.361	0.1085	144 ----- 144	0.04
Month: September	1989 Wells Spawning	Summer Chinook	Wells	88	18.	1.782	0.142	72 ----- 72	0.02
Month: October	1989 Wells Spawning	Summer Chinook	Wells	88	16.	1.931	0.1538	21 ----- 21	E-2
Month: November	1989 Wells Spawning	Summer Chinook	Wells	88	13.	0.825	0.1788	80 ----- 80	0.02
Month: December	1989 Wells Spawning	Summer Chinook	Wells	88	10.	0.977	0.2116	124 ----- 124	0.03

WDFPROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Saprolegnia

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flou Index	Density Index	Number LOSS	% Loss
-----									
LCoL									
Month: January	1989 Kalama Falls	Late Coho	Kalama Falls	87	25.	1.146	0.1208	285	0.03
								----- 285	
Month: February	1989 Kalama Falls	Late Coho	Kalama Falls	87	23.	1.42	0.1498	280	0.03
								----- 280	
Month: March	1989 Cowlitz Kalama Falls Kalama Falls Lewis River	Late Coho Fall Chinook Late Coho Early Coho	Cowlitz Kalama Falls Kalama Falls Lewis River	87 88 87 87	21. 329. 20. 22.	2.027 1.285 1.589 1.666	0.2582 0.1488 0.1676 0.1249	5585 40 875 22	0.12 E-3 0.00 E-i
								----- 6522	
Month: April	1989 Kalama Falls Kalama Falls Kalama Falls	Fall Chinook Late Coho Spring Chinook	Kalama Falls Kalama Falls Kalama Falls	88 87 88	174. 16. 206.	0.821 1.815 1.136	0.0874 0.1914 0.1363	150 345 20	E-3 0.04 E-3
								----- 515	
Month: May	1989 Kalama Falls Kalama Falls	Fall Chinook Spring Chinook	Kalama Falls Kalama Falls	88 88	93. 104.	1.267 0.957	0.1349 0.1005	305 40	E-2 0.02
								-mm----- 345	
Month: June	1989 Kalama Falls Kalama Falls Kalama Falls	Fall Chinook Late Coho Spring Chinook	Kalama Falls Kalama Falls Kalama Falls	88 88 88	123. 234. 93.	0.619 0.749 1.028	0.065 0.062 0.1079	2140 50 10	0.87 E-2 E-2
								----- 2200	
Month: July	1989 Kalama Falls Kalama Falls Kalama Falls	Fall Chinook Late Coho Spring Chinook	Kalama Falls Kalama Falls Kalama Falls	88 88 88	112. 116. 72.	0.914 0.899 0.705	0.0777 0.0757 0.0634	630 195 1165	0.47 0.02 0.71
								----- 1990	
Month: August	1989 Kalama Falls Kalama Falls Kalama Falls	Fall Chinook Late Coho Spring Chinook	Kalama Falls Kalama Falls Kalama Falls	88 88 88	78. 59. 41.	1.185 1.26 1.016	0.1066 0.1194 0.0915	20 685	0.43 E-3 0.42
								-m-v---- 1280	

WDF PROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Saprolegnia

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
-----									
LC01									
Month: September	1989								
	Kalama Falls	Late Coho	Kalama Falls	88	45.	1.496	0.1417	50	E-2
	Kalama Falls	Spring Chinook	Kalama Falls	88	36.	1.098	0.0988	150	0.09
	Lewis River	Late Coho	Lewis River	88	92.	1.485	0.0924	1051	0.05
	Lewis River	Spring Chinook	Kalama Falls	88	38.	0.209	0.0112	101	0.07
	Lewis River	Spring Chinook	Lewis River	88	36.	0.515	0.0419	322	0.16
								-----	
								1674	
Month: October	1989								
	Kalama Falls	Late Coho	Kalama Falls	88	39.	1.462	0.1539	335	0.03
	Kalama Falls	Spring Chinook	Kalama Falls	88	26.	1.215	0.1215	325	0.2
	Lewis River	Late Coho	Lewis River	88	60.	1.474	0.0606	812	0.04
	Lewis River	Spring Chinook	Kalama Falls	88	32.	0.201	0.0135	349	0.24
	Lewis River	Spring Chinook	Lewis River	88	30.	0.549	0.0481	408	0.21
								-----	
								2229	
Month: November	1989								
	Lewis River	Late Coho	Lewis River	88	45.	1.133	0.073	308	0.01
	Lewis River	Spring Chinook	Kalama Falls	88	23.	0.239	0.016	154	0.11
	Lewis River	Spring Chinook	Lewis River	88	23.	0.599	0.0539	226	0.12
								-----	
								688	
Month: December	1989								
	Elokomin	Fall Chinook	Elokomin	A	-0-	-0-	-0-	809	21.9
	Grays River	Fall Chinook	Kalama Falls	89	-0-	-0-	-0-	325000	19.3
	Kalama Falls	Spring Chinook	Kalama Falls	88	-0-	-0-	-0-	125	17.8
	Lewis River	Early Coho	Lewis River	89	-0-	37. 1.178	0.0759	159	0.01
	Lewis River	Early Coho	Lewis River			-0-	-0-	4290	0.38
	Lewis River	Early Coho	Lewis River	A	-0-	-0-	-0-	481	19.9
	Lewis River	Late Coho	Lewis River	A	-0-	-0-	-0-	1117	11.1
	Lewis River	Spring Chinook	Kalama Falls	88	17.	0.27	0.0181	223	0.16
	Lewis River	Spring Chinook	Lewis River	88	17.	0.67	0.0603	353	0.18
	Lower Kalama	Fal 1 Chinook	Kalama Falls	A	-0-	-0-	-0-	184	14.1
								-----	
								332741	
UC01									
Month: December	1989								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0-	-0-	-0-	50	2.66
	Lyon's Ferry	Spring Chinook	Tucannon	A	-0-	-0-	-0-	4	4.35
	Priest Rapids	Fall Chinook	Priest Rapids	88	-0-	-0-	-0-	57600	1.02
	Priest Rapids	Fall Chinook	Priest Rapids	A	-0-	-0-	-0-	19	0.43
								-----	
								57673	









UDF program QCO1  
DISEASE PREVALENCE SUMMARY  
May 04,

Disease Category: Other  
Agent: Precocious males

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
-----									
LCoL									
Month: January	1989 Lewis River	Spring Chinook	Lewis River	87	12.	1.72	0.0893	218	0.04
								----- 218	
Month: February	1989 Lewis River	Spring Chinook	Lewis River	87	10.	1.533	0.1029	132	0.03
								----- 132	
Month: March	1989 Lewis River	Spring Chinook	Lewis River	87	8.	6.64	0.4455	90	0.02
								----- 90	
Month: October	1989 Lewis River	Spring Chinook	Lewis River	88	30.	0.549	0.0481	73	0.04
								----- 73	
Month: November	1989 Lewis River	Spring Chinook	Kalama Falls	88	23.	0.239	0.016	126	0.09
	1989 Lewis River	Spring Chinook	Lewis River	88	23.	0.599	0.0539	135	0.07
								----- 261	
Month: December	1989 Lewis River	Spring Chinook	Kalama Falls	88	17.	0.27	0.0181	756	0.54
	1989 Lewis River	Spring Chinook	Lewis River	88	17.	0.67	0.0603	640	0.33
								----- 1396	
-----									
UCoL									
Month: April	1989 Wet Is Spawning	Summer Chinook	Wells	87	9.	1.553	0.1931	268	0.06
								----- 268	
Month: December	1989 Wells Spawning	Summer Chinook	Wells	88	10.	0.977	0.2116	270	0.07
								----- 270	

Disease Category: Other  
Agent: Marking mortality

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
-----									
UCoL									
Month: November	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	29.	0.405	0.108	130	0.03
								----- 130	

WDF PROGRAM QCOI  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flou Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: January									
1989									
Cowlitz		Late Coho	Cowlitz	87	30.	1.639	0.2087	400	E-2
Cowlitz		Spring Chinook	Cowlitz	87	11.	0.541	0.0676	2200	0.34
Cowlitz		Spring Chinook	Cowlitz	88	380.	0.499	0.0499	33200	0.91
Elokomin		Early Coho	Grays River	87	29.	1.249	0.0937	100	0.05
Elokomin		Fall Chinook	Elokmin	88	649.	1.794	0.1345	9853	0.22
Elokomin		Late Coho	Elokomin	87	26.	1.526	0.1111	1000	0.06
Grays River		Early Coho	Big Creek	87	26.	2.156	0.0503	32	E-2
Grays River		Early Coho	Grays River	88	834.	1.412	0.0794	4745	0.31
Grays River		Fall Chinook	Elokomin	88	492.	0.801	0.0601	1463	0.18
Grays River		Fall Chinook	Grays River	88	751.	1.148	0.0753	1125	0.04
Kalama Falls		Fall Chinook	Kalama Falls	88	855.	0.751	0.0633	2555	0.08
Kalama Falls		Late Coho	Kalama Falls	87	25.	1.146	0.1208	30	E-3
Kalama Falls		Spring Chinook	Kalama Falls	88	685.	0.848	0.0679	1485	0.21
Lewis River		Early Coho	Lewis River	87	28.	1.696	0.1131	79	E-2
Lewis River		Late Coho	Lewis River	87	35.	2.534	0.1717	882	0.02
Lewis River		Spring Chinook	Lewis River	87	12.	1.72	0.0893	304	0.06
Lower Kalama		Early Coho	Kalama Falls	87	45.	1.542	0.0617	465	0.09
Lower Kalama		Early Coho	Kalama Falls	88	1100.	0.61	0.0732	340	0.04
Louer Kalama		Early Coho	Washougal	87	45.	0.156	0.0062	155	0.28
Lower Kalama		Fall Chinook	Kalama Falls	88	1000.	0.45	0.0569	850	0.06
Lower Kalama		Spring Chinook	Kalama Falls	87	26.	1.942	0.0847	620	0.12
Speelyai		Early Coho	Lewis River	87	29.	2.384	0.1703	100	0.07
Speelyai		Early Coho	Lewis River	88	1060.	1.253	0.0627	1000	0.05
Speelyai		Spring Chinook	Lewis River	88	631.	0.861	0.0451	2200	0.22
Washougal		Fall Chinook	Washougal	88	1086.	1.235	0.0494	9210	0.22
Uashougal		Late Coho	Washougal	87	26.	3.051	0.0575	87	E-3
								-----	
								74480	
Month: February									
1989									
Coxlitz		Fall Chinook	Cowlitz	88	800.	1.273	0.0432	9400	0.12
Cowlitz		Late Coho	Cowlitz	87	25.	2.017	0.2569	1740	0.04
Cowlitz		Spring Chinook	Cowlitz	87	8.	0.692	0.0865	2000	0.31
Cowlitz		Spring Chinook	Cowlitz	88	300.	0.581	0.0692	18180	0.5
Elokomin		Early Coho	Elokomin	88	850.	1.968	0.1329	1203	0.27
Elokomin		Early Coho	Grays River	88	493.	1.689	0.152	1700	0.32
Elokomin		Early Coho	Kalama Falls	88	1020.	2.197	0.1483	1500	0.25
Elokomin		Fall Chinook	Elokomin	88	415.	1.307	0.1048	1846	0.04
Elokomin		Late Coho	Elokomin	87	25.	1.595	0.1161	700	0.04
Grays River		Early Coho	Big Creek	87	23.	2.315	0.054	45	0.01
Grays River		Early Coho	Grays River	88	494.	1.498	0.0856	8558	0.57
Grays River		Fall Chinook	Elokomin	88	400.	1.254	0.0941	365	0.04
Grays River		Fall Chinook	Grays River	88	594.	1.078	0.0607	2397	0.12
Kalama Falls		Fall Chinook	Kalama Falls	88	657.	0.895	0.0843	11570	0.29
Kalama Falls		Late Coho	Kalama Falls	87	23.	1.42	0.1498	530	0.06
Kalama Falls		Spring Chinook	Kalama Falls	88	541.	0.805	0.0725	3435	0.48
Lewis River		Early Coho	Lewis River	87	25.	1.852	0.1234	43	E-3
Lewis River		Late Coho	Lewis River	87	32.	1.934	0.1251	662	0.02
Lewis River		Spring Chinook	Lewis River	87	10.	1.533	0.1029	223	0.04
Louer Kalama		Early Coho	Kalama Falls	87	36.	1.984	0.0794	420	0.07
Louer Kalama		Early Coho	Kalama Falls	88	810.	0.609	0.0731	1103	0.12
Louer Kalama		Early Coho	Washougal	87	36.	0.183	0.0073	140	0.26
Louer Kalama		Fall Chinook	Kalama Falls	88	663.	0.546	0.0683	1000	-0.06
Louer Kalama		Spring Chinook	Kalama Falls	87	20.	2.193	0.0957	420	0.08
Speelyai		Early Coho	Lewis River	87	28.	2.445	0.1747	100	0.07
Speelyai		Early Coho	Lewis River	88	800.	1.509	0.0755	1025	0.06
Speelyai		Spring Chinook	Lewis River	88	441.	1.097	0.0575	2800	0.28
Toutle		Early Coho	Grays River	87	24.	0.475	0.0122	150	0.07
Toutle		Fall Chinook	Grays River	88	351.	0.65	0.0116	371	0.02

WDF PROGRAM QCOI  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
.....									
LCol									
	Washougal	Fall Chinook	Priest Rapids	88	950.	1.278	0.0484	2000	0.38
	Washougal	Fall Chinook	Washougal	88	870.	1.392	0-5269	8593	0.17
	Washougal	Late Coho	Uashougal	87	25.	2.753	0.0575	36	E-3
								.....	
								84255	
Month: March									
1989									
	Cowlitz	Fall Chinook	Cowlitz	88	343.	1.03	0.0787	7200	0.09
	Cowlitz	Spring Chinook	Cowlitz	88	135.	1.002	0.1113	14670	0.41
	Elokomin	Early Coho	Elokomin	88	400.	1.482	0.1144	1252	0.23
	Elokomin	Early Coho	Grays River	88	227.	1.032	0.0796	1868	0.35
	Elokomin	Early Coho	Kalama Falls	88	449.	2.575	0.1738	504	0.1
	Elokomin	Fall Chinook	Elokomin	88	224.	1.063	0.1117	3631	0.08
	Elokomin	Late Coho	Elokomin	87	21.	1.453	0.1275	452	0.02
	Elokomin	Late Coho	Elokomin	88	619.	1.967	0.1449	1414	0.12
	Grays River	Early Coho	Big Creek	87	19.	2.648	0.0618	100	0.03
	Grays River	Early Coho	Grays River	88	284.	0.862	0.0497	2904	0.39
	Grays River	Fall Chinook	Grays River	88	263.	1.066	0.0677	1364	0.1
	Kalama Falls	Fall Chinook	Kalama Falls	88	329.	1.285	0.1488	1750	0.04
	Kalama Falls	Late Coho	Kalama Falls	87	20.	1.589	0.1676	90	E-2
	Kalama Falls	Spring Chinook	Kalama Falls	88	335.	0.075	0.0091	435	0.06
	Lewis River	Early Coho	Lewis River	87	22.	1.666	0.1249	110	0.01
	Lewis River	Late Coho	Lewis River	87	26.	2.03	0.1353	688	0.02
	Lewis River	Late Coho	Lewis River	88	1153.	1.296	0.0866	391	0.02
	Lewis River	Spring Chinook	Lewis River	87	8.	6.64	0.4455	94	0.02
	Lower Kalama	Early Coho	Kalama Falls	87	25.	1.439	0.1007	775	0.13
	Lower Kalama	Early Coho	Kalama Falls	88	358.	0.686	0.0823	1275	0.23
	Lower Kalama	Early Coho	Washougal	87	25.	0.133	0.0093	155	0.28
	Lower Kalama	Fall Chinook	Kalama Falls	88	377.	0.786	0.0976	1522	0.07
	Lower Kalama	Spring Chinook	Kalama Falls	87	12.	2.259	0.1581	775	0.14
	Speelyai	Early Coho	Lewis River	87	25.	2.361	0.1686	100	0.07
	Speelyai	Early Coho	Lewis River	88	500.	0.684	0.0325	4940	0.3
	Speelyai	Spring Chinook	Lewis River	88	248.	1.524	0.0871	2008	0.2
	Toutle	Early Coho	Grays River	87	20.	0.579	0.0137	200	0.09
	Toutle	Fall Chinook	Grays River	88	27.	0.639	0.0106	2100	0.72
	Washougal	Fall Chinook	Priest Rapids	88	492.	0.333	0.007	5417	0.36
	Washougal	Fall Chinook	Washougal	88	437.	1.078	0.0269	5085	0.11
	Washougal	Late Coho	Lewis River	88	1044.	1.203	0.0503	6821	0.19
	Washougal	Late Coho	Washougal	87	20.	2.706	0.068	1044	0.03
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								71134	

WDF PROGRAM 'X.01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
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LCoL	1989								
Month: April	Cowlitz	Fall Chinook	Cowlitz	88	159.	0.94	0.1306	15200	0.19
	Cowlitz	Spring Chinook	Cowlitz	87	8.	0.664	0.083	1300	0.2
	Cowlitz	Spring Chinook	Cowlitz	88	98.	1.039	0.1386	10070	0.28
	Elokomin	Early Coho	Elokomin	88	231.	0.301	0.0878	840	0.16
	Elokomin	Early Coho	Grays River	88	140.	1.332	0.1028	1512	0.29
	Elokomin	Fall Chinook	Elokomin	88	116.	1.596	0.1738	10243	0.23
	Elokomin	Late Coho	Elokmin	87	17.	1.647	0.1445	848	0.05
	Elokomin	Late Coho	Elokmin	88	325.	1.825	0.1408	659	0.06
	Grays River	Early Coho	Big Creek	87	16.	2.76	0.069	400	0.11
	Grays River	Early Coho	Grays River	88	172.	0.993	0.0559	3853	0.52
	Grays River	Fall Chinook	Grays River	88	132.	1.003	0.0392	1795	0.14
	Kalama Falls	Fall Chinook	Kalama Falls	88	174.	0.821	0.0874	4780	0.13
	Kalama Falls	Late Coho	Kalama Falls	87	16.	1.815	0.1914	110	0.01
	Kalama Falls	Late Coho	Kalama Falls	88	659.	0.91	0.0955	1390	0.14
	Kalama Falls	Spring Chinook	Kalama Falls	88	206.	1.136	0.1363	595	0.08
	Lewis River	Early Coho	Lewis River	87	18.	1.894	0.1421	163	0.02
	Lewis River	Late Coho	Lewis River	87	20.	2.428	0.1619	377	E-2
	Lewis River	Late Coho	Lewis River	88	837.	1.047	0.0856	3647	0.07
	Lower Kalama	Early Coho	Kalama Falls	87	15.	2.08	0.1456	779	0.13
	Lower Kalama	Early Coho	Kalama Falls	88	158.	1.222	0.1467	328	0.06
	Lower Kalama	Early Coho	Uashougal	87	15.	0.192	0.0134	150	0.28
	Lower Kalama	Fall Chinook	Kalama Falls	88	197.	1.19	0.1478	2169	0.1
	Lower Kalama	Spring Chinook	Kalama Falls	87	10.	2.862	0.1717	425	0.08
	Speelyai	Early Coho	Lewis River	87	20.	3.066	0.219	100	0.07
	Speelyai	Early Coho	Lewis River	88	167.	1.411	0.067	2500	0.16
	Speelyai	Spring Chinook	Lewis River	88	211.	1.131	0.0916	630	0.07
	Toutle	Early Coho	Grays River	87	15.	0.769	0.0181	150	0.07
	Toutle	Fall Chinook	Grays River	88	136.	2.233	0.0369	6800	0.28
	Washougal	Fall Chinook	Priest Rapids	88	216.	0.224	0.0055	2480	0.21
	Washougal	Fall Chinook	Washougal	88	213.	0.931	0.0234	2480	0.05
	Washougal	Late Coho	Lewis River	88	457.	2.302	0.0753	14027	0.41
	Uashougal	Late Coho	Uashougal	87	19.	2.35	0.0752	2444	0.48
	Washougal	Late Coho	Washougal	88	562.	1.057	0.0393	860	0.34
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WDF PROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
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LCol									
Month: May	1989								
	Cowlitz	Fall Chinook	Cowlitz	88	97.	1.051	0.1752	24100	0.33
	Cowlitz	Late Coho	Cowlitz	88	293.	0.816	0.1098	6350	0.08
	Cowlitz	Spring Chinook	Cowlitz	88	65.	0.277	0.0369	19980	1.66
	Elokomin	Early Coho	Elokmin	88	131.	0.637	0.0474	160	0.03
	Elokmin	Early Coho	Grays River	88	89.	1.195	0.088	447	0.09
	Elokomin	Fall Chinook	Elokomin	88	60.	2.276	0.1622	6600	0.18
	Elokomin	Late Coho	Elokomin	87	17.	1.379	0.164	810	0.1
	Elokomin	Late Coho	Elokomin	88	187.	0.537	0.0318	529	0.05
	Grays River	Early Coho	Grays River	88	104.	1.103	0.0626	1667	0.23
	Grays River	Fall Chinook	Grays River	88	61.	1.582	0.0691	3789	0.29
	Kalama Falls	Fall Chinook	Kalama Falls	88	93.	1.267	0.1349	8970	0.25
	Kalama Falls	Late Coho	Kalama Falls	88	429.	1.177	0.1236	510	0.05
	Kalama Falls	Spring Chinook	Kalama Falls	88	104.	0.957	0.1005	865	0.52
	Lewis River	Late Coho	Lewis River	87	18.	2.092	0.1627	296	E-2
	Lewis River	Late Coho	Levis River	88	377.	0.758	0.0853	2384	0.08
	Lower Kalama	Early Coho	Kalama Falls	87	14.	2.144	0.1501	380	0.06
	Lower Kalama	Early Coho	Kalama Falls	88	96.	1.535	0.1843	339	0.06
	Lower Kalama	Early Coho	Washouga 1	87	14.	1.994	0.014	35	0.06
	Lower Kalama	Fall Chinook	Kalama Falls	88	102.	1.219	0.0732	1464	0.07
	Lower Kalama	Spring Chinook	Kalama Falls	88	180.	0.52	0.0657	283	0.05
	Speelyai	Early Coho	Lewis River	87	18.	3.275	0.2339	100	0.07
	Speelyai	Early Coho	Lewis River	88	129.	1.749	0.0889	400	0.03
	Speelyai	Spring Chinook	Leuis River	88	186.	0.873	0.0623	300	0.03
	Toutle	Early Coho	Grays River	87	14.	0.751	0.0177	800	0.37
	Toutle	Fall Chinook	Elokomin	88	72.	2.74	0.0453	1800	0.08
	Washougal	Fall Chinook	Priest Rapids	88	97.	0.327	0.0074	69	E-2
	Washougal	Fall Chinook	Uashougal	88	98.	1.65	0.0381	1453	0.03
	Washougal	Late Coho	Leuis River	88	232.	2.116	0.0733	6113	0.19
	Washougal	Late Coho	Washougal	87	17.	0.251	0.008	1343	2.66
	Washougal	Late Coho	Washouga 1	88	235.	1.821	0.0689	480	0.19
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								92816	

UDF PROCRAU QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
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LCoL	1989								
Month: June	Cowlitz	Fall Chinook	Cowlitz	88	64.	1.665	0.2312	11200	0.16
	Cowlitr	Fall Chinook	Cowlitr	88	41.	0.298	0.0083	2300	1.19
	Cowlitr	Fall Chinook	Cowlitz	88	41.	0.298	0.0083	11200	5.81
	Cowlitz	Fall Chinook	Cowlitz	88	64.	1.665	0.2312	2300	0.03
	Cowlitz	Late Coho	Cowlitz	87	16.	2.535	0.3169	500	0.06
	Cowlitr	Late Coho	Cowlitz	88	160.	1.151	0.0984	63630	0.84
	Cowlitz	Spring Chinook	Cowlitz	88	45.	0.353	0.0471	4100	0.34
	Elokomin	Early Coho	Elokomin	88	109.	0.578	0.0434	383	0.08
	Elokomin	Early Coho	Grays River	88	78.	0.677	0.0508	709	0.16
	Elokomin	Fall Chinook	Elokmin	88	60.	2.327	0.1659	1386	0.04
	Elokmin	Late Coho	Elokomin	88	144.	0.497	0.0273	1755	0.15
	Grays River	Early Coho	Grays River	88	80.	0.725	0.0277	3219	0.45
	Grays River	Fall Chinook	Grays River	88	50.	2.019	0.0742	2543	0.22
	Kalama Falls	Fall Chinook	Kalama Falls	88	123.	0.619	0.065	6900	2.81
	Kalama Falls	Late Coho	Kalama Falls	88	234.	0.749	0.062	1730	0.18
	Kalama Falls	Spring Chinook	Kalama Falls	88	93.	1.028	0.1079	430	0.26
	Lewis River	Late Coho	Lewis River	88	240.	1.106	0.056	1150	0.05
	Lower Kalama	Early Coho	Kalama Falls	88	65.	1.058	0.1336	2000	0.36
	Lower Kalama	Fall Chinook	Kalama Falls	88	70.	1.584	0.095	600	0.03
	Lower Kalama	Spring Chinook	Kalama Falls	88	131.	0.64	0.0808	901	0.17
	Speelyai	Early Coho	Lewis River	87	18.	3.27	0.2336	200	0.13
	Speelyai	Early Coho	Lewis River	88	106.	1.249	0.0937	4400	0.28
	Speelyai	Spring Chinook	Lewis River	88	100.	1.337	0.0955	1000	0.1
	Toutle	Fall Chinook	Elokmin	88	64.	2.739	0.0453	4000	0.17
	Uashougal	Fall Chinook	Priest Rapids	88	82.	0.523	0.1122	70	E-2
	Uashougal	Fall Chinook	Uashougal	88	66.	0.223	0.0051	751	0.14
	Uashougal	Late Coho	Lewis River	88	159.	1.187	0.0396	6031	0.25
	Washougal	Late Coho	Uashougal	88	160.	1.516	0.0485	1358	0.71
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Month: July	1989								
	Cowlitz	Fall Chinook	Cowlitz	88	42.	0.294	0.0357	2300	1.19
	Cowlitz	Spring Chinook	Cowlitz	88	38.	0.355	0.0473	7500	0.63
	Elokomin	Early Coho	Elokomin	88	77.	0.726	0.0544	296	0.06
	Elokomin	Early Coho	Grays River	88	60.	0.807	0.0606	422	0.09
	Elokomin	Late Coho	Elokomin	88	91.	0.683	0.0375	778	0.07
	Grays River	Early Coho	Grays River	88	61.	0.887	0.0339	2501	0.35
	Kalama Falls	Fall Chinook	Kalama Falls	88	112.	0.914	0.0777	560	0.42
	Kalama Falls	Late Coho	Kalama Falls	88	116.	0.899	0.0757	2645	0.27
	Kalama Falls	Spring Chinook	Kalama Falls	88	72.	0.705	0.0634	580	0.35
	Lewis River	Late Coho	Lewis River	88	190.	1.279	0.0648	808	0.04
	Lower Kalama	Early Coho	Kalama Falls	88	40.	1.461	0.1845	229	0.04
	Lower Kalama	Spring Chinook	Kalama Falls	88	74.	0.934	0.1179	150	0.03
	Speelyai	Early Coho	Leuis River	88	98.	1.324	0.0969	2400	0.21
	Speelyai	Spring Chinook	Lewis River	88	113.	0.627	0.0446	3200	0.33
	Uashougal	Fall Chinook	Uashougal	88	51.	1.767	0.0707	687	0.13
	Uashougal	Late Coho	Uashougal	88	114.	1.537	0.054	6599	0.19
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WDF PROGRAM QCOI  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
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LCol									
Month: August	1989								
	Cowlitr	Fall Chinook	Cowlitr	88	23.	0.429	0.0537	4500	2.39
	Cowlitr	Late Coho	Cowlitr	88	55.	1.356	0.1675	7290	0.13
	Cowlitr	Spring Chinook	Cowlitr	88	29.	0.421	0.0561	8000	0.68
	Elokornin	Early Coho	Elokomin	88	57.	0.892	0.6022	284	0.06
	Elokcmn	Early Coho	Grays River	88	52.	0.881	0.5944	377	0.08
	Elokcmn	Late Coho	Elokcmn	88	53.	0.979	0.0537	910	0.08
	Grays River	Early Coho	Grays River	88	45.	1.066	0.0408	2500	0.35
	Kalama Falls	Late Coho	Kalama Falls	88	59.	1.26	0.1194	1120	0.12
	Kalama Falls	Spring Chinook	Kalama Falls	88	41.	1.016	0.0915	115	0.07
	Lewis River	Late Coho	Lewis River	88	86.	2.171	0.1099	638	0.03
	Lower Kalama	Early Coho	Kalama Falls	88	37.	1.532	0.1936	98	0.02
	Lower Kalama	Spring Chinook	Kalama Falls	88	68.	0.988	0.1248	292	0.05
	Speelyai	Early Coho	Lewis River	88	83.	1.463	0.107	1200	0.11
	Speelyai	Spring Chinook	Lewis River	88	55.	1.171	0.0834	1200	0.13
	Uashougal	Late Coho	Uashouga 1	88	79.	1.96	0.0682	5088	0.15
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								33612	
Month: September	1989								
	Cowlitr	Fall Chinook	Cowlitr	88	14.	0.585	0.0709	1040	0.57
	Cowlitr	Late Coho	Cowlitr	88	49.	1.477	0.1786	8160	0.17
	Cowlitr	Spring Chinook	Cowlitr	88	20.	0.507	0.0676	15300	1.37
	Elokomin	Early Coho	Elokomin	88	51.	0.973	0.073	227	0.05
	Elokomin	Early Coho	Grays River	88	44.	0.985	0.0739	352	0.08
	Elokomin	Late Coho	Elokomin	88	49.	1.218	0.0562	910	0.08
	Grays River	Early Coho	Grays River	88	33.	1.31	0.0501	1600	0.23
	Kalama Falls	Late Coho	Kalama Falls	88	45.	1.496	0.1417	1220	0.13
	Kalama Falls	Spring Chinook	Kalama Falls	88	36.	1.098	0.0988	275	0.17
	Lewis River	Late Coho	Lewis River	88	92.	1.485	0.0924	901	0.04
	Lewis River	Spring Chinook	Kalama Falls	88	38.	0.209	0.0112	82	0.06
	Lewis River	Spring Chinook	Lewis River	88	36.	0.515	0.0419	135	0.07
	Lower Kalama	Early Coho	Kalama Falls	88	28.	1.845	0.0231	463	0.08
	Lower Kalama	Early Coho	Kalama Falls	88	28.	1.845	0.0231	463	0.08
	Lower Kalama	Spring Chinook	Kalama Falls	88	48.	1.302	0.0544	413	0.08
	Speelyai	Early Coho	Lewis River	88	62.	1.777	0.13	1200	0.11
	Speelyai	Spring Chinook	Lewis River	88	31.	1.338	0.0892	100	0.05
	Washougal	Late Coho	Uashougal	88	64.	2.24	0.0787	2463	0.07
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								35304	
Month: October	1989								
	Cowlitr	Late Coho	Cowlitr	88	44.	1.555	0.188	11020	0.23
	Cowlitr	Spring Chinook	Cowlitr	88	18.	0.537	0.0772	7575	0.69
	Elokomin	Early Coho	Elokcmn	88	38.	1.258	0.0874	86	0.02
	Elokomin	Early Coho	Grays River	88	38.	1.17	0.0813	150	0.03
	Elokomin	Late Coho	Elokcmn	88	37.	1.337	0.0686	555	0.05
	Grays River	Early Coho	Grays River	88	27.	1.5	0.0574	1100	0.16
	Kalama Falls	Late Coho	Kalama Falls	88	39.	1.462	0.1539	1810	0.19
	Kalama Falls	Spring Chinook	Kalama Falls	88	26.	1.215	0.1215	60	0.04
	Lewis River	Early Coho	Lewis River	88	45.	0.249	0.005	41	0.05
	Lewis River	Late Coho	Lewis River	88	60.	1.474	0.0606	462	0.02
	Lewis River	Spring Chinook	Kalama Falls	88	32.	0.201	0.0135	177	0.12
	Lewis River	Spring Chinook	Lewis River	88	30.	0.549	0.0481	179	0.09
	Lower Kalama	Early Coho	Kalama Falls	88	22.	2.194	0.0274	1033	0.19
	Lower Kalama	Spring Chinook	Kalama Falls	88	43.	1.39	0.0581	1551	0.29
	Speelyai	Early Coho	Lewis River	88	50.	1.919	0.1404	600	0.06
	Speelyai	Spring Chinook	Lewis River	11	31.	1.338	0.0892	100	0.05
	Uashougal	Late Coho	Washougal	88	50.	2.998	0.2517	987	0.03
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WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
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LCol									
Month: November	1989								
	Cowlitr	Late Coho	Cowlitr	88	37.	1.733	0.2095	4880	0.1
	Cowlitz	Spring Chinook	Cowlitz	88	12.	0.706	0.1015	4500	0.41
	Elokomin	Early Coho	Elokomin	88	29.	1.47	0.1062	45	E-2
	Elokomin	Early Coho	Grays River	88	31.	1.288	0.093	103	0.02
	Elokomin	Late Coho	Elokmin	88	30.	1.528	0.0784	400	0.03
	Grays River	Early Coho	Grays River	88	27.	1.46	0.0573	156	0.02
	Kalama Falls	Late Coho	Kalama Falls	88	30.	1.763	0.1856	65	E-2
	Lewis River	Early Coho	Lewis River	88	44.	1.058	0.0693	122	0.01
	Lewis River	Late Coho	Lewis River	88	45.	1.133	0.073	864	0.04
	Lewis River	Spring Chinook	Kalama Falls	88	23.	0.239	0.016	253	0.18
	Lewis River	Spring Chinook	Lewis River	88	23.	0.599	0.0539	238	0.12
	Lower Kalama	Early Coho	Kalama Falls	88	20.	0.137	0.0286	839	0.15
	Lower Kalama	Spring Chinook	Kalama Falls	88	43.	1.265	0.0575	544	0.1
	Speelyai	Early Coho	Lewis River	88	44.	1.722	0.123	100	0.07
	Speelyai	Spring Chinook	Lewis River	88	23.	1.633	0.1089	200	0.1
	Washougal	Late Coho	Uashougal	88	42.	3.243	0.2611	490	0.01
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								13799	
Month: December	1989								
	Cowlitz	Late Coho	Cowlitz	88	33.	1.858	0.2246	6400	0.13
	Cowlitr	Spring Chinook	Cowlitz	88	10.	0.789	0.1134	7000	0.64
	Elokomin	Early Coho	Elokmin	88	30.	1.229	0.1675	1100	0.23
	Elokomin	Early Coho	Grays River	88	30.	1.369	0.0951	900	0.2
	Elokomin	Fall.Chinook	Elokmin	89	969.	5.821	0.1663	628	0.06
	Elokomin	Fall Chinook	Elokmin	89	-0-	-0-	-0-	467100	8.81
	Elokomin	Late Coho	Elokomin	88	30.	1.528	0.0783	500	0.04
	Elokomin	Late Coho	Elokomin	89	-0-	-0-	-0-	235000	10.8
	Grays River	Early Coho	Grays River	88	26.	2.195	0.0732	800	0.11
	Kalama Falls	Fall Chinook	Kalama Falls	89	-0-	-0-	-0-	374200	0.67
	Kalama Falls	Late Coho	Kalama Falls	88	30.	1.215	0.1281	410	0.04
	Kalama Falls	Late Coho	Kalama Falls	89	-0-	-0-	-0-	116300	14.5
	Kalama Falls	Late Coho	Lewis River	89	-0-	-0-	-0-	157400	19.7
	Kalama Falls	Spring Chinook	Kalama Falls	89	1100.	1.645	0.0494	350	0.09
	Kalama Falls	Spring Chinook	Kalama Falls	89	-0-	-0-	-0-	149300	15.5
	Lewis River	Early Coho	Lewis River	88	37.	1.178	0.0759	418	0.04
	Lewis River	Late Coho	Lewis River	88	37.	1.248	0.0804	355	0.02
	Lewis River	Late Coho	Lewis River	89	-0-	-0-	-0-	244300	3.68
	Lewis River	Late Coho	Lewis River	89	-0-	-0-	-0-	244300	3.71
	Lewis River	Late Coho	Uashougal	88	32.	0.086	0.0055	12	0.02
	Lewis River	Spring Chinook	Kalama Falls	88	17.17.	0.67	0.0181	198	0.14
	Lewis River	Spring Chinook	Lewis River				0.0603	197	0.1
	Lower Kalama	Early Coho	Kalama Falls	88	18.	1.335	0.0812	496	0.09
	Lower Kalama	Spring Chinook	Kalama Falls	88	40.	1.11	0.0606	310	0.06
	Speelyai	Early Coho	Lewis River	88	37.	1.462	0.1253	100	0.08
	Speelyai	Early Coho	Lewis River	88	-0-	-0-	-0-	260000	9.08
	Speelyai	Spring Chinook	Lewis River	89	-0-	20.	-0- 0.9	100	0.05
	Speelyai	Spring Chinook	Lewis River				-0-	155000	9.54
	Uashougal	Fall Chinook	Uashougal	89	-0-	-0-	-0-	730000	8.86
	Uashougal	Fall Chinook	Uashougal	A	-0-	-0-	-0-	387	5.59
	Washougal	Late Coho	Lewis River	89	-0-	-0-	-0-	604900	-18.2
	Washougal	Late Coho	Uashougal	88	35.	3.554	0.2899	226	E-2
	Washougal	Late Coho	Washougal	89	-0-	-0-	-0-	136600	6.42
	Washougal	Late Coho	Uashougal	A	-0-	-0-	-0-	27	0.43
								-----	
								3895314	

WDFPROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number Loss	% LOSS
-----									
UCoL									
Month: January	1989								
	Klickitat	Fall Chinook	Priest Rapids	88	990.	1.126	0.0804	2760	0.17
	Klickitat	Late Coho	Lewis River	87	29.	1.016	0.1143	746	0.06
	Klickitat	Spring Chinook	Klickitat	87	12.	1.655	0.1211	155	0.02
	Klickitat	Spring Chinook	Klickitat	88	416.	1.039	0.0795	6040	0.34
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	87	18.	0.462	0.0592	678	0.16
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	1038.	0.263	0.0584	3692	0.28
	Lyon's Ferry	Spring Chinook	Tucannon	88	373.	0.195	0.0325	678	0.46
	Rocky Reach	Early Coho	Big Creek	87	16.	1.054	0.1363	100	0.03
	Rocky Reach	Fall Chinook	Priest Rapids	87	12.	0.607	0.0785	284	0.15
	Tucannon	Spring Chinook	Tucannon	87	11.	1.091	0.3059	262	0.17
	Uells Spawning	Spring Chinook	Leavenuorth	88	75.	2.201	0.4952	6	E-3
								mm-e----	
								15401	
Month: February	1989								
	Klickitat	Fall Chinook	Priest Rapids	88	608.	0.716	0.0691	30252	0.65
	Klickitat	Late Coho	Elokomin	88	500.	1.369	0.1141	3163	1.07
	Klickitat	Late Coho	Leuis River	87	26.	1.777	0.1221	586	0.05
	Klickitat	Spring Chinook	Klickitat	87	10.	1.792	0.1311	99	0.01
	Klickitat	Spring Chinook	Klickitat	88	244.	0.628	0.0733	3319	0.19
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	87	14.	0.565	0.0678	948	0.22
	Lyon's Ferry	Spring Chinook	Tucannon	87	11.	1.059	0.2969	474	0.31
	Lyon's Ferry	Spring Chinook	Tucannon	88	181.	0.342	0.0571	155	0.1
	Priest Rapids	Fail Chinook	Priest Rapids	88	750.	0.418	0.0392	4420	0.17
	Ringold	Spring Chinook	Klickitat	88	258.	0.498	0.091	352	0.03
	Rocky Reach	Early Coho	Big Creek	87	15.	1.091	0.1411	33	E-2
	Rocky Reach	Fall Chinook	Priest Rapids	87	11.	0.644	0.0834	151	0.08
	Rocky Reach	Fall Chinook	Priest Rapids	88	700.	0.663	0.1161	2900	1.23
	Uells Spawning	Spring Chinook	Leavenworth	88	65.	1.166	0.2623	22	0.01
								mm-----	
								46874	
Month: March	1989								
	Klickitat	Fall Chinook	Priest Rapids	88	211.	1.233	0.1251	9043	0.22
	Klickitat	Late Coho	Lewis River	87	21.	2.664	0.1499	865	0.07
	Klickitat	Spring Chinook	Klickitat	87	9.	1.983	0.15	740	0.11
	Klickitat	Spring Chinook	Klickitat	88	140.	0.825	0.118	3140	0.18
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	87	11.	0.607	0.0778	596	0.14
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	248.	0.659	0.1648	5934	0.22
	Lyon's Ferry	Spring Chinook	Tucannon	87	9.	1.206	0.3384	923	0.6
	Lyon's Ferry	Spring Chinook	Tucannon	88	118.	0.458	0.0763	49	0.03
	Ringold	Spring Chinook	Klickitat	88	141.	0.725	0.1433	1293	0.11
	Rocky Reach	Early Coho	Big Creek	87	14.	1.135	0.1469	34	E-2
	Rocky Reach	Fall Chinook	Priest Rapids	87	10.	0.686	0.0888	70	0.04
	Rocky Reach	Fall Chinook	Priest Rapids	88	485.	0.826	0.1446	855	0.37
	Rocky Reach	Late Coho	Cowlitr	88	1149.	0.732	0.122	5695	1.04
								-----	
								29237	



WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Normal

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% Loss
-----									
UCoL									
Month: August	1989								
	Klickitat	Late Coho	Cowlitz	88	76.	1.432	0.0991	705	0.04
	Klickitat	Spring Chinook	Klickitat	88	42.	1.645	0.0538	170	0.02
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	51.	0.817	0.2722	673	0.15
	Lyon's Ferry	Spring Chinook	Tucannon	88	30.	0.174	0.1293	51	0.03
	Rocky Reach	Fall Chinook	Priest Rapids	88	60.	0.398	0.0858	700	0.3
	Rocky Reach	Late Coho	Cowlitz	88	90.	0.44	0.0518	190	0.04
								-----	
								2489	
Month: September	1989								
	Klickitat	Late Coho	Cowlitz	88	60.	1.667	0.1154	944	0.05
	Klickitat	Spring Chinook	Klickitat	88	40.	1.68	0.055	269	0.03
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	46.	0.863	0.1849	579	0.13
	Lyon's Ferry	Spring Chinook	Tucannon	88	25.	0.207	0.1542	2s	0.02
	Rocky Reach	Fall Chinook	Priest Rapids	88	41.	0.474	0.1021	370	0.16
	Rocky Reach	Late Coho	Cowlitz	88	67.	0.529	0.0623	600	0.13
								-----	
								2787	
Month: October	1989								
	Klickitat	Late Coho	Cowlitz	88	54.	1.709	0.0729	2340	0.16
	Klickitat	Spring Chinook	Klickitat	88	37.	1.825	0.0572	230	0.03
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	34.	0.86	0.1791	647	0.14
	Lyon's Ferry	Spring Chinook	Tucannon	88	22.	0.24	0.0724	25	0.02
	Rocky Reach	Fall Chinook	Priest Rapids	88	30.	0.577	0.1242	800	0.34
	Rocky Reach	Late Coho	Cowlitz	88	49.	0.64	0.0753	400	0.08
								-----	
								4442	
Month: November	1989								
	Klickitat	Late Coho	Cowlitz	88	44.	2.168	0.0925	772	0.05
	Klickitat	Spring Chinook	Klickitat	88	37.	2.017	0.0632	191	0.02
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	29.	0.405	0.108	1876	0.39
	Lyon's Ferry	Spring Chinook	Tucannon	88	16.	0.861	0.2315	86	0.06
	Rocky Reach	Fall Chinook	Priest Rapids	88	27.	0.438	0.0516	100	0.04
	Rocky Reach	Late Coho	Cowlitz	88	34.	0.812	0.0956	100	0.02
								-----	
								3125	
Month: December	1989								
	Klickitat	Late Coho	Cowlitz	88	39.	4.6	0.1002	526	0.03
	Klickitat	Spring Chinook	Klickitat	88	30.	1.164	0.0729	150	0.02
	Klickitat	Spring Chinook	Klickitat	89	1233.	1.025	0.0448	4120	0.42
	Klickitat	Spring Chinook	Wind River	89	1254.	0.875	0.0383	8809	0.69
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	22.	0.485	0.1164	1485	0.31
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	89	"0"	"0"	"0"	187336	5.32
	Lyon's Ferry	Spring Chinook	Tucannon	88	15.	0.862	0.2317	663	0.44
	Lyon's Ferry	Spring Chinook	Tucannon	89	932.	0.066	0.0132	715	0.68
	Lyon's Ferry	Spring Chinook	Tucannon	89	"0"	"0"	"0"	8000	5.94
	Priest Rapids	Fall Chinook	Priest Rapids	89	"0"	"0"	"0"	600000	8.62
	Rocky Reach	Early Coho	Grays River	89	"0"	"0"	"0"	6000	1.71
	Rocky Reach	Early Coho	Lewis River	89	"0"	"0"	"0"	12000	-5.91
	Rocky Reach	Fall Chinook	Priest Rapids	88	16.	0.646	0.076	100	0.04
	Rocky Reach	Fall Chinook	Uells	89	"0"	"0"	"0"	10000	1.06
	Rocky Reach	Late Coho	Cowlitz	88	25.	0.987	0.1161	100	0.02
								-----	
								840004	

WDF PROGRAM QCO1  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Other  
Agent: Pinhead .

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number LOSS	% LOSS
-----									
LCoL									
Month: January	1989								
	Kalama Falls	Late Coho	Kalama Falls	87	25.	1.146	0.1208	165	0.02
	Lewis River	Early Coho	Lewis River	87	28.	1.696	0.1131	43	E-3
	Lewis River	Late Coho	Lewis River	87	35.	2.534	0.1717	1482	0.03
	Lewis River	Spring Chinook	Lewis River	87	12.	1.72	0.0893	112	0.02
								-----	
								1802	
Month: February	1989								
	Grays River	Early Coho	Big Creek	87	23.	2.315	0.054	23	E-2
	Kalama Falls	Late Coho	Kalama Falls	87	23.	1.42	0.1498	330	0.03
	Lewis River	Early Coho	Lewis River	87	25.	1.852	0.1234	56	E-2
	Lewis River	Late Coho	Lewis River	87	32.	1.934	0.1251	756	0.02
	Lewis River	Spring Chinook	Lewis River	87	10.	1.533	0.1029	94	0.02
								-----	
								1259	
Month: March	1989								
	Elokomin	Fall Chinook	Elokomin	88	224.	1.063	0.1117	175	E-3
	Grays River	Fall Chinook	Grays River	88	263.	1.066	0.0677	273	0.02
	Kalama Falls	Late Coho	Kalama Falls	87	20.	1.589	0.1676	95	0.01
	Lewis River	Early Coho	Lewis River	87	22.	1.666	0.1249	86	E-2
	Lewis River	Late Coho	Lewis River	87	26.	2.03	0.1353	541	0.01
	Lewis River	Late Coho	Lewis River	88	1153.	1.296	0.0866	174	E-2
	Lewis River	Spring Chinook	Lewis River	87	8.	6.64	0.4455	49	E-2
								-----	
								1393	
Month: April	1989								
	Elokomin	Fall Chinook	Elokomin	88	116.	1.596	0.1738	28120	0.64
	Grays River	Fall Chinook	Grays River	88	132.	1.003	0.0392	1605	0.12
	Lewis River	Early Coho	Lewis River	87	18.	1.894	0.1421	133	0.01
	Lewis River	Late Coho	Lewis River	87	20.	2.428	0.1619	313	E-2
	Lewis River	Late Coho	Lewis River	88	837.	1.047	0.0856	2797	0.06
								-----	
								32968	
Month: May	1989								
	Elokomin	Fall Chinook	Elokomin	88	60.	2.276	0.1622	2400	0.07
	Grays River	Early Coho	Grays River	88	104.	1.103	0.0626	361	0.05
	Grays River	Fall Chinook	Grays River	88	61.	1.582	0.0691	1849	0.14
	Kalama Falls	Late Coho	Kalama Falls	88	429.	1.177	0.1236	2760	0.28
	Lewis River	Late Coho	Lewis River	87	18.	2.092	0.1627	224	E-2
	Lewis River	Late Coho	Lewis River	88	377.	0.758	0.0853	2661	0.09
								-----	
								10255	



















WDF PROGRAM QC01  
DISEASE PREVALENCE SUMMARY  
May 04, 1990

Disease Category: Viral  
Agent: EIBS

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flou Index	Density Index	Number Loss	% Loss
-----									
LCol									
Month: March	1989 Coulitz	Late Coho	Coulitz	87	21.	2.027	0.2582	55850	1.17
								-----	
								55850	
UC01									
Month: April	1989 Lyon's Ferry	Spring Chinook	Tucannon	87	9.	1.159	0.3253	2253	1.48
								-----	
								2253	
Month: July	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	70.	0.631	0.2103	190	0.04
								-----	
								190	
Month: September	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	46.	0.863	0.1849	2352	0.51
								-----	
								2352	
Month: October	1989 Lyon's Ferry	Fall Chinook	Lyon's Ferry	88	34.	0.86	0.1791	1157	0.25
								-----	
								1157	

APPENDIX C

## Appendix C. Hematocrit Summary

## Yearling Chinook Lots, 1987-88-89

## Spring Chinook

		MEAN	MAX	MIN
Cowlitz	BY85	36.2	44	23
	BY86	35.3	47	5
	BY87	32.0	39	26
Kalama (L.Kal)	BY85	NA	NA	NA
	BY86	32.9	39	26
	BY87	33.1	39	23
Klickitat	BY85	41	54	30
	BY86	36.6	46	24
	BY87	31.1	39	18
Lewis	BY85	35.9	47	26
	BY86	35.7	47	24
	BY87	31.1	40	17
Ringold	BY86	43.4	57	31
Speelyai	BY86	3s. 1	43	26
Tucannon	BY85	40.2	51	33
	BY86	39	57	31
	BY87	36.7	44	13

## Mean hematocrit (by brood year)

BY85	38.3
BY86	36.9
BY87	32.8

Mean hematocrit  
(all lots) 36.0

Mean hemat range 31.1-43.4  
(all lots)

## Fall Chinook

		MEAN	MAX	MIN
Lyons	BY85	43.7	52	3s
	BY86	42.3	so	33
	BY87	38.9	48	29
Ringold	BY85	41.4	51	28
R. Reach	BY85	41.5	50	27
	BY86	38.4	47	22
	BY87	38.7	47	30

## Mean hematocrit (by brood year)

BY85	42.2
BY86	40.4
BY87	38.9

Mean hematocrit 41  
(all lots)

Mean hemat range 38.4-43.7  
(all lots)

## Summer Chinook

		MEAN	MAX	MIN
We1 1s	BY85	34.8	44	30
	BY86	34.2	42	4
	BY 87	36.4	44	30

Mean hematocrit 35.1  
(all lots)

Mean hemat range 34.2-36.4  
(all lots)

## Appendix C. Hematocrit Summary.

## Subyearling Chinook Lots, 1987-88-89.

## Fall Chinook

Cowlitz		AVE	MAX	MIN
	BY86	31.9	41	22
	BY86d	34.6	47	21
	BY87	35.3	4s	28
	BY87d	34.5	43	26
	BY88	36.8	44	30
Elokomin	BY86	35.2	42	27
	BY87	29.2	40	23
	BY88	33.1	40	22
Grays	BY86	34	43	2s
	BY86	33.9	44	20
	BY87	37	43	30
	BY88	33	42	23
Kalama	BY86	34.6	42	29
	BY87	37.2	43	31
	BY88	35.2	4s	2s
Klickitat	BY86	40.2	so	17
	BY86	39.4	47	31
	BY86	34.5	42	28
	BY87	33.9	41	26
	BY88	36.1	47	29
L.Kalama	BY86	34.3	41	27
	BY88	35.4	43	28
Lyons	BY86	41.6	51	31
	BY87	37.5	46	23
	BY88	36.4	49	26

## Fall Chinook

Priest		AVE	MAX	MIN
	BY86	42.6	52	3s
	BY87	34.8	47	27
	BY88	39.8	49	30
R. Reach	BY86	37.5	39	36
Toutle	BY87	31.5	39	22
	BY88	36.9	47	29
Washougal	BY86	34.3	41	26
	BY87	30.1	36	23
	BY88	34.1	4s	2s

Mean hematocrit (by brood year)

BY86	36.3
BY87	34.1
BY88	35.7

Mean hematocrit 35.5  
(all lots)Mean hemat range 29.2-42.6  
(all lots)

## Appendix C . Hematocrit Summary.

## Yearling Coho Lots, 1987-88-89.

## Late Coho

		AVE	MAX	MIN
Cowlitz	BY85	36.2	43	30
	BY86	31.8	39	20
	BY87	30.8	38	25
Elokomin	BY85	39.6	49	29
	BY86	36.7	44	27
	BY87	32.7	40	23
Kalama	BY85	33.5	41	25
	BY86	31.1	41	19
	BY87	31.4	39	20
Klickitat	BY85	40.6	48	27
	BY86	32.7	42	23
	BY87	33.8	45	27
Lewis	BY85	35.3	45	27
	BY87	32.4	43	27
R. Reach	BY85	41.6	52	28
	BY86	37.9	46	30
Washouga 1	BY85	29.8	42	21
	BY86	35.5	51	18
	BY87	27.4	33	18
	BY87(Sta)	31.2	40	15

Mean hematocrit (by brood year)

BY85	36.7
BY86	34.3
BY87	31.4

Mean hematocrit	34.1
(all lots)	

Mean hemat range	27.4-41.6
(all lots)	

## Early Coho

		AVE	MAX	MIN
Grays	BY85	29.1	40	3
	BY86	37.9	48	29
	BY87	31	37	26
Kalama (L.Kal)	BY85	37.9	53	28
	BY86	27.1	38	10
	BY87	29.1	34	23
Lewis	BY86	32.9	44	24
	BY87	32.4	43	27
R. Reach	BY87	39.6	49	29
Toutle	BY86	32.2	38	19
	BY87	29.7	38	22
Washouga 1	BY85	29.4	39	19

Mean hematocrit (by brood year)

BY85	32.1
BY86	32.5
BY87	32.4

Mean hematocrit	32.4
(all lots)	

Mean hemat range	27.1-39.6
(all lots)	



Appendix C. Heaatocrit Leucocrit Data

Summer Chinook Heaatocrit Leucocrit Analysis

Fish #	Hells		Hatchery	
	Hemat.	BY87 Leuco.	Hemat.	BY88 Leuco.
1	33	1	33	1
2	32	1	25	1.5
3	37	1	27	1
4	37	1	29	1
5	38	1	33	1
6	41	0.5	39	1
7	41	1	33	1
8	42	1	38	0.5
9	34	1	31	1
10	42	1	33	1
11	37	1	25	1
12	41	0.5	30	1
13	37	0.5	26	1
14	36	1	23	1
15	38	1	34	1.5
16	33	1	22	1
17	35	1	24	1.5
18	39	1	22	1.5
19	37	1	33	1
20	39	0.5	37	1
21	36	0.5	26	1
22	36	0.5	34	1
23	30	0.5	38	1
24	39	1	33	0.5
25	38	1	39	1.5
26	38	1	30	1.5
27	37	1	36	1
28	37	1	30	1
29	34	1	37	1
30	34	1	33	1.5
31	34	1	22	1.5
32	36	0.5	38	0.5
33	33	0.5	33	1
34	33	0.5	35	1
35	33	0.5	33	1
36	38	0.5	32	1
37	38	0.5	39	1.5
38	32	0.5	30	1
39	36	0.5	31	1
40	44	1	38	1.5
41	35	0.5	38	1.5
42	37	1	31	1.5
43	35	0.5	36	1.5
44	33	0.5	35	1
45	37	1	35	1
46	37	1	32	1
47	33	1	38	1
48	37	1	36	1.5
49	37	0.5	35	1
50	37	0.5	35	1
51	33	1	34	1.5
52	33	1	26	1.5
53	32	0.5	38	1
54	33	0.5	39	1.5
55	33	0.5	32	1
56	37	1	33	1
57	33	1	22	1
58	37	0.5	28	1
59	36	0.5	33	2
60	32	0.5	33	1.5
AVG	36.4	0.82	31.4	1.1
MAX	44	1	39	2
MIN	30	0	23	0
EIBS	1pos/60		0pos/60	
BKD	3pos/60		3pos/60	





Appendix C. Heaatocrit Leucocrit Data  
 Fall Chinook Hematocrit Leucocrit Analysis

Fish #	Wash Hemat	BY88 Leuco.
1	27	1.5
2	27	2
3	29	
4	34	3
5	4	0.5
6	3	1.5
7	7	1.1
8	3	1.5
9	3	1.5
10	29	2
11	2	1.5
12	3	1.5
13	36	1.5
14	40	0.5
15	32	1.5
16	40	1.5
17	38	1.1
18	36	1.1
19	6	1.5
20	2	1.5
21	27	1.5
22	3	1.5
23	3	1.5
24	5	1.5
25	3	1.5
26	7	2
27	3	1.5
28	3	2
29	3	2
30	36	1.5
31	35	1.5
32	3	2
33	3	3
34	3	1.5
35	3	1.5
36	3	2
37	3	1.5
38	3	1.5
39	3	1.5
40	40	1.1
41	30	1.5
42	32	1.1
43	29	1.5
44	36	1.5
45	28	2.5
46	38	
47	35	1
48	37	1.5
49	19	2
50	3	1.1
51	3	1.5
52	36	1.1
53	1	2
54	4	1
55	4	1
56	4	2
57	3	2
58	3	1
59	3	1.5
60	37	2
AVG	34.1	1.49
MAX	45	2.5
MIN	25	0.5
EIBS	0 pos/60	
BKD	0 pos/60	

Appendix C. Hematocrit Leucocrit Data

Early Coho Heratocrit Leucocrit Analysis

Fish #	Hatchery			R. Reach			Toultle		
	Gry s Heaat	BY87 Leuco.	L. Kal Hemat.	BY87 Leuco.	R. Reach Hemat.	BY87 Leuco.	Toultle Hemat.	BY87 Leuco.	
1		1.5	30	1	33	1	30	1	
2	32	0.5	29		29	2	29		
3		1.5	33	1.5	30	1	30	1	
4		2	28	1.5	30	0	33	1	
5	33	1	30		33	1	30		
6	36	1.5	27		33	0.5	33		
7	31	1.5	27		33	0.5	33	1.5	
8	32	1.5	27		33	1	33	1.5	
9	30	1	29	1	33	0.5	33	1	
10	32	1.5	31	1	33	0.5	33	0.5	
11		1	33		33	0.5	33	0.5	
12	33	1.5	33		33	1	33	1	
13	32		34		33	1	33	1	
14	28		29	0.5	33	1	33	1	
15	32		22		33	1	33	1	
16	32		22		33	1	33	1	
17	39	1	33		33	1	33	0.5	
18	33	1.5	26		33	1	33	1	
19	30	1	27	1	33	0	33	1	
20	33	1.5	28		33	0.5	33	0.5	
21	34	1.5	32		33	0.5	33	0.5	
22	37	1.5	32		33	0.5	33	0.5	
23	38		30	0	33	1	33	1	
24	28	1.5	27	2	33	1	33	1	
25	38	1.5	28	2	33	1	33	1	
26	32	1.5	33	2	33	0	33	1	
27	32	1	28	1	33	0.5	33	1	
28	26	1	33	1.5	33	0.5	33	1	
29	26	1	33	1.5	33	0.5	33	1	
30	32	1	29	1	33	0	33	0.5	
31	37	1	25	2	33	0	33	0.5	
32	31	1.5	25	2	33	0	33	0.5	
33	30	1.5	27	1.5	33	0	33	0.5	
34	28	1.5	25	0.5	33	0	33	0.5	
35	22	1.5	25	1	33	0	33	0.5	
36	32	1	31	1	33	0	33	0.5	
37	30	1.5	26	1	33	0	33	0.5	
38	29	1.5	31	1	33	0	33	0.5	
39	30	2	29	1	33	0	33	0.5	
40	28	2	33	1	33	0	33	0.5	
41		2	31	1	33	0	33	0.5	
42		2	33	1	33	0	33	0.5	
43	3	1	33	1	33	0	33	0.5	
44	33	1.5	30	1	33	0	33	0.5	
45	33	1.5	34	1	33	0	33	0.5	
46	33	1.5	27	1	33	0	33	0.5	
47	34	1	29	1	33	0	33	0.5	
48	32	1	28	1	33	0	33	0.5	
49	34	1	30	1	33	0	33	0.5	
50	30	4	28	1	33	0	33	0.5	
51	32	1	22	1	33	0	33	0.5	
52	29	2	33	1	33	0	33	0.5	
53	30	2	28	1	33	0	33	0.5	
54	33	2	33	1	33	0	33	0.5	
55	33	1	27	1	33	0	33	0.5	
56	32	1	27	1	33	0	33	0.5	
57	33	1.5	28	1	33	0	33	0.5	
58	29	1.5	28	1	33	0	33	0.5	
59	33	2	30	1	33	0	33	0.5	
60	29	2	29	1	33	0	33	0.5	
AVG	33	1.5	29	1.4	39	0.4	29	0	
MAX	37	2.5	34	2	33	1	33	1	
MIN	26	0	23	0	29	0	28	0	
EIBS	0 pos/60		1 pos/60		0 pos/60		0 pos/60		
BKD	4 pos/60		1 pos/60		0 pos/60		0 pos/60		

Appendix c. Hematocrit Leucocrit Data

Late Coho Hematocrit Leucocrit Analysis

Fish #	Wash ((Kli) B87		K. Falls		Hatchery		Cowlitz		BY87		Elokin		BY87	
	Hemat.	Leuco.	Hemat.	Leuco.	Hemat.	Leuco.	Hemat.	Leuco.	Hemat.	Leuco.	Hemat.	Leuco.	Hemat.	Leuco.
3	26	1	31	0	32	1.5	31	1.5	31	1.5	31	1.5	31	1.5
11	25	1	28	1	32	1	31	1	31	1	31	1	31	1
33	0.5	1	20	1	29	1	30	1	31	1	31	1	31	1
44	2	1	21	1	30	1	30	1	31	1	31	1	31	1
55	1	1	32	1	34	1	33	1	31	1	31	1	31	1
67	1	1	29	1	33	1	33	1	31	1	31	1	31	1
76	1	1	29	1	33	1	33	1	31	1	31	1	31	1
88	0.5	1	29	1	33	1	33	1	31	1	31	1	31	1
99	1	1	34	2	32	1	33	1	31	1	31	1	31	1
100	1	1	33	1	33	1	33	1	31	1	31	1	31	1
110	1	1	37	1	33	1	33	1	31	1	31	1	31	1
111	1	1	36	1	33	1	33	1	31	1	31	1	31	1
123	1	1	36	1	33	1	33	1	31	1	31	1	31	1
133	1	1	36	1	33	1	33	1	31	1	31	1	31	1
144	1	1	36	1	33	1	33	1	31	1	31	1	31	1
155	0.5	1	36	1	33	1	33	1	31	1	31	1	31	1
166	1	1	36	1	33	1	33	1	31	1	31	1	31	1
177	1	1	36	1	33	1	33	1	31	1	31	1	31	1
188	1	1	36	1	33	1	33	1	31	1	31	1	31	1
199	1	1	36	1	33	1	33	1	31	1	31	1	31	1
200	1	1	36	1	33	1	33	1	31	1	31	1	31	1
211	1	1	36	1	33	1	33	1	31	1	31	1	31	1
222	1	1	36	1	33	1	33	1	31	1	31	1	31	1
233	1	1	36	1	33	1	33	1	31	1	31	1	31	1
244	1	1	36	1	33	1	33	1	31	1	31	1	31	1
255	1	1	36	1	33	1	33	1	31	1	31	1	31	1
266	1	1	36	1	33	1	33	1	31	1	31	1	31	1
277	1	1	36	1	33	1	33	1	31	1	31	1	31	1
288	1	1	36	1	33	1	33	1	31	1	31	1	31	1
299	1	1	36	1	33	1	33	1	31	1	31	1	31	1
300	1	1	36	1	33	1	33	1	31	1	31	1	31	1
311	1	1	36	1	33	1	33	1	31	1	31	1	31	1
322	1	1	36	1	33	1	33	1	31	1	31	1	31	1
333	1	1	36	1	33	1	33	1	31	1	31	1	31	1
344	1	1	36	1	33	1	33	1	31	1	31	1	31	1
355	1	1	36	1	33	1	33	1	31	1	31	1	31	1
366	1	1	36	1	33	1	33	1	31	1	31	1	31	1
377	1	1	36	1	33	1	33	1	31	1	31	1	31	1
388	1	1	36	1	33	1	33	1	31	1	31	1	31	1
399	1	1	36	1	33	1	33	1	31	1	31	1	31	1
400	1	1	36	1	33	1	33	1	31	1	31	1	31	1
411	1	1	36	1	33	1	33	1	31	1	31	1	31	1
422	1	1	36	1	33	1	33	1	31	1	31	1	31	1
433	1	1	36	1	33	1	33	1	31	1	31	1	31	1
444	1	1	36	1	33	1	33	1	31	1	31	1	31	1
455	1	1	36	1	33	1	33	1	31	1	31	1	31	1
466	1	1	36	1	33	1	33	1	31	1	31	1	31	1
477	1	1	36	1	33	1	33	1	31	1	31	1	31	1
488	1	1	36	1	33	1	33	1	31	1	31	1	31	1
499	1	1	36	1	33	1	33	1	31	1	31	1	31	1
500	1	1	36	1	33	1	33	1	31	1	31	1	31	1
511	1	1	36	1	33	1	33	1	31	1	31	1	31	1
522	1	1	36	1	33	1	33	1	31	1	31	1	31	1
533	1	1	36	1	33	1	33	1	31	1	31	1	31	1
544	1	1	36	1	33	1	33	1	31	1	31	1	31	1
555	1	1	36	1	33	1	33	1	31	1	31	1	31	1
566	1	1	36	1	33	1	33	1	31	1	31	1	31	1
577	1	1	36	1	33	1	33	1	31	1	31	1	31	1
588	1	1	36	1	33	1	33	1	31	1	31	1	31	1
599	1	1	36	1	33	1	33	1	31	1	31	1	31	1
600	1	1	36	1	33	1	33	1	31	1	31	1	31	1
611	1	1	36	1	33	1	33	1	31	1	31	1	31	1
622	1	1	36	1	33	1	33	1	31	1	31	1	31	1
633	1	1	36	1	33	1	33	1	31	1	31	1	31	1
644	1	1	36	1	33	1	33	1	31	1	31	1	31	1
655	1	1	36	1	33	1	33	1	31	1	31	1	31	1
666	1	1	36	1	33	1	33	1	31	1	31	1	31	1
677	1	1	36	1	33	1	33	1	31	1	31	1	31	1
688	1	1	36	1	33	1	33	1	31	1	31	1	31	1
699	1	1	36	1	33	1	33	1	31	1	31	1	31	1
700	1	1	36	1	33	1	33	1	31	1	31	1	31	1
711	1	1	36	1	33	1	33	1	31	1	31	1	31	1
722	1	1	36	1	33	1	33	1	31	1	31	1	31	1
733	1	1	36	1	33	1	33	1	31	1	31	1	31	1
744	1	1	36	1	33	1	33	1	31	1	31	1	31	1
755	1	1	36	1	33	1	33	1	31	1	31	1	31	1
766	1	1	36	1	33	1	33	1	31	1	31	1	31	1
777	1	1	36	1	33	1	33	1	31	1	31	1	31	1
788	1	1	36	1	33	1	33	1	31	1	31	1	31	1
799	1	1	36	1	33	1	33	1	31	1	31	1	31	1
800	1	1	36	1	33	1	33	1	31	1	31	1	31	1
811	1	1	36	1	33	1	33	1	31	1	31	1	31	1
822	1	1	36	1	33	1	33	1	31	1	31	1	31	1
833	1	1	36	1	33	1	33	1	31	1	31	1	31	1
844	1	1	36	1	33	1	33	1	31	1	31	1	31	1
855	1	1	36	1	33	1	33	1	31	1	31	1	31	1
866	1	1	36	1	33	1	33	1	31	1	31	1	31	1
877	1	1	36	1	33	1	33	1	31	1	31	1	31	1
888	1	1	36	1	33	1	33	1	31	1	31	1	31	1
899	1	1	36	1	33	1	33	1	31	1	31	1	31	1
900	1	1	36	1	33	1	33	1	31	1	31	1	31	1
911	1	1	36	1	33	1	33	1	31	1	31	1	31	1
922	1	1	36	1	33	1	33	1	31	1	31	1	31	1
933	1	1	36	1	33	1	33	1	31	1	31	1	31	1
944	1	1	36	1	33	1	33	1	31	1	31	1	31	1
955	1	1	36	1	33	1	33	1	31	1	31	1	31	1
966	1	1	36	1	33	1	33	1	31	1	31	1	31	1
977	1	1	36	1	33	1	33	1	31	1	31	1	31	1
988	1	1	36	1	33	1	33	1	31	1	31	1	31	1
999	1	1	36	1	33	1	33	1	31	1	31	1	31	1
1000	1	1	36	1	33	1	33	1	31	1	31	1	31	1
AVG	27.4	1.17	31.4	1.05	30.8	1.8	32.7	1.5	32.7	1.5	32.7	1.5	32.7	1.5
MAX	33	2	39	2	38	3	40	2	40	2	40	2	40	2
MIN	18	0	20	0	25	1	23	0	23	0	23	0	23	0
ETBS	8 pos/60		18 pos/60		13 pos/60		10 pos/60		10 pos/60		10 pos/60		10 pos/60	
BKD	2 pos/60		0 pos/58		3 pos/60		4 pos/60		4 pos/60		4 pos/60		4 pos/60	

Appendix c. Heaatocrit Leucocrit Data

Late Coho Hematocrit Leucocrit Analysis

Fish #	Wash (Sta) 887 Hatchery		Klick 887		BY87	
	Hemat	Leuco	Hemat	Leuco	Hemat	Leuco
1	27	0.5	33	NA	NA	NA
2	34	1.1	35	NA	NA	NA
3	33	0.0	33	NA	NA	NA
4	30	0.0	35	NA	NA	NA
5	35	1.5	34	NA	NA	NA
6	34	1.1	33	NA	NA	NA
7	27	0.5	36	NA	NA	NA
8	34	0.0	35	NA	NA	NA
9	33	1.1	35	NA	NA	NA
10	33	1.5	32	NA	NA	NA
11	33	1.1	33	NA	NA	NA
12	33	0.0	33	NA	NA	NA
13	33	0.5	33	NA	NA	NA
14	33	1.1	37	NA	NA	NA
15	33	1.5	35	NA	NA	NA
16	33	0.5	33	NA	NA	NA
17	33	1.1	38	NA	NA	NA
18	33	0.5	38	NA	NA	NA
19	33	0.0	32	NA	NA	NA
20	33	0.0	34	NA	NA	NA
21	33	1.1	37	NA	NA	NA
22	33	1.1	27	NA	NA	NA
23	33	0.5	35	NA	NA	NA
24	33	0.0	38	NA	NA	NA
25	33	0.5	30	NA	NA	NA
26	33	0.5	30	NA	NA	NA
27	33	1.1	34	NA	NA	NA
28	33	0.0	33	NA	NA	NA
29	33	1.1	37	NA	NA	NA
30	33	1.5	36	NA	NA	NA
31	33	1.1	28	NA	NA	NA
32	33	0.5	33	NA	NA	NA
33	33	0.5	32	NA	NA	NA
34	33	1.1	33	NA	NA	NA
35	33	0.5	32	NA	NA	NA
36	33	0.5	30	NA	NA	NA
37	33	1.1	42	NA	NA	NA
38	33	1.1	29	NA	NA	NA
39	33	1.1	34	NA	NA	NA
40	33	1.1	38	NA	NA	NA
41	33	0.0	34	NA	NA	NA
42	33	1.1	37	NA	NA	NA
43	33	1.1	33	NA	NA	NA
44	33	1.1	30	NA	NA	NA
45	33	0.0	35	NA	NA	NA
46	33	1.1	35	NA	NA	NA
47	38	1.1	35	NA	NA	NA
48	33	1.1	36	NA	NA	NA
49	33	1.1	35	NA	NA	NA
50	33	1.1	33	NA	NA	NA
51	33	1.1	34	NA	NA	NA
52	33	1.1	33	NA	NA	NA
53	33	1.5	37	NA	NA	NA
54	33	1.1	32	NA	NA	NA
55	33	1.1	33	NA	NA	NA
56	33	1.1	33	NA	NA	NA
57	33	1.1	33	NA	NA	NA
58	33	0.5	33	NA	NA	NA
59	33	0.5	30	NA	NA	NA
60	33	0.5	45	NA	NA	NA
AVG	31.2	0.82	33.8			
MAX	40	1.5	45			
MIN	15	0	27			
EIBS	20 pos/60		0 pos/60			
BKD	3 pos/60		2 pos/60			

## APPENDIX D

Appendix D contains the Organosomatic Analysis Summary of Fish Autopsy reports and the raw data.

SUMMARY OF FISH AUTOPSY

LOCATION: Cowlitz

QUAL. CONTROL INSPECT. NO.: 806

Species, Chinook      Autopsy Date: 03/03/89      Sample Size: 60  
 Strain: Spring      Age: BY87      Tissue Collection No.: NA  
 Mark/Lot: CWT6342/04 R3      Disease Survey No.: NA  
 Unit: Pds 18-26      Water Temp. 41 F      Case History No.: 806  
 Fish Source: Cowlitz      Water Hardness: NA ppm      Custody No.: NA  
 Egg Source: Cowlitz      Investigator: BR/PM/PC  
 Hatching Date: NA      Reason for Autopsy: Pre-lib Exam  
 Remarks: Yearling release

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	180.070 mm	23.73 mm	13%
Weight	60.090 gr	20.32 gr	34%
Ktl*	1.030	0.06	6%
Ctl**	3.721		
Hematocrit	32.040	2.68	8%
Leucocrit	0.860	0.42	49%
Serum Protein	4.670	0.7	15%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 100%	N 100%	N 100%	0 62%	0 2%	B 0%	0 100%	N 100%	A 40%	0 32%
B1 0%	F 0%	S 0%	1 38%	1 52%	R 97%	1 0%	S 0%	B 58%	1 68%
B2 0%	C 0%	L 0%	2 0%	2 45%	G 2%	2 0%	M 0%	C 2%	2 0%
E1 0%	M 0%	S&L 0%	x 0.4	2 2%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I 0%		2 0%	E 2%		U 0%	E 0%	x 0.7
H1 0%	OT Of	OT 0%		x 1.5	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

100%	100%	100%	62%	98%	100%	100%	98%
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Summary of Means

I	0.4	1.5	0.0	0.7
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SEX: M: 72% F: 28% U: 0%

GENERAL REMARKS

FINS NA

SKIN Well smolted, easily descaled.

GONADS NA

OTHER Data incomplete for #53-60. Three fish had swollen thymus.

Qual.Qual. Control N806 86-8A

SN	LGH	WGT	Kt1	EYE	GILL	PSBR	THY,	FAT	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	195	69.2	0.9	N	N	N	1	2	R	0	N	A	1	M	34	1.0	4.5
2	111	12.9	0.9	N	N	N	0	2	R	0	N	A	0	M	39	1.0	4.6
3	118	15.4	0.9	N	N	N	0	2	R	0	N	A	0	M			
4	188	70.1	1.1	N	N	N	1	2	R	0	N	B	1	M	28	1.0	4.6
5	196	74.7	1.0	N	N	N	1	2	R	0	N	B	0	M	33	0.0	4.9
6	172	48.7	1.0	N	N	N	1	2	R	0	N	A	0	M	30	1.0	4.6
7	122	15.8	0.9	N	N	N	1	2	R	0	N	A	1	F	34	1.0	4.1
8	163	37	0.9	N	N	N	1	1	R	0	N	A	0	F	34	1.0	3.2
9	185	57.7	0.9	N	N	N	0	2	R	0	N	A	1	F	31	1.0	4.3
10	198	75.6	1.0	N	N	N	0	1	R	0	N	A	1	F	29	1.0	5.2
11	186	58.7	0.9	N	N	N	1	2	R	0	N	A	1	F	33	0.5	5.1
12	142	27.9	1.0	N	N	N	1	1	R	0	N	A	1	F	31	0.5	4.8
13	186	58	0.9	N	N	N	8	1	R	0	N	B	0	F	36	1.0	2.8
14	181	54.4	0.9	N	N	N	1	1	R	0	N	C	1	F	28	2.5	3.5
15	187	62.9	1.0	N	N	N	0	1	R	0	N	B	1	F	26	0.0	4.7
16	200	79.4	1.0	N	N	N	1	0	R	0	N	B	1	F	34	0.5	3.6
17	148	33.2	1.0	N	N	N	2	1	R	0	N	B	1	F			
18	193	68.4	1.0	N	N	N	8	1	R	0	N	A	0	F	37	0.5	4.3
19	182	65.4	1.1	N	N	N	1	1	R	0	N	A	0	F	32	0.0	5.5
20	205	85	1.0	N	N	N	1	1	R	0	N	B	1	F			
21	186	63.5	1.0	N	N	N	0	1	R	0	N	B	1	F	34	1.0	5.5
22	180	56	1.0	N	N	N	0	2	R	0	N	A	1	F	32	1.0	4.2
23	123	18.1	1.0	N	N	N	0	1	R	0	N	B	1	F	35	1.0	5.1
24	138	23.9	0.9	N	N	N	1	1	R	0	N	B	1	F	31	1.0	4.2
25	170	44.3	0.9	N	N	N	1	1	R	0	N	B	1	F	31	0.5	5.2
26	193	65	0.9	N	N	N	1	1	R	0	N	B	1	F	31	1.0	4.6
27	204	83.3	1.0	N	N	N	1	1	R	0	N	B	1	F	29	0.5	3.6
28	197	81.4	1.1	N	N	N	1	2	R	0	N	B	1	F	28	1.0	5.4
29	196	71.3	0.9	N	N	N	1	1	R	0	N	B	1	F	32	0.5	4.7
30	214	101.3	1.0	N	N	N	1	1	R	0	N	B	1	M	32	1.0	5.3
31	204	88.8	1.0	N	N	N	1	1	R	0	N	B	1	M	30	1.0	5.7
32	181	55.5	0.9	N	N	N	8	1	R	0	N	B	1	F	29	1.0	4.6
33	181	58.8	1.0	N	N	N	1	3	R	0	N	B	1	F			
34	197	75	1.0	N	N	N	8	2	R	0	N	B	1	M			
35	185	63.6	1.0	N	N	N	8	2	R	0	N	B	1	M	33	1.0	5.1
36	185	61.3	1.0	N	N	N	8	2	R	0	N	B	1	F	31	1.5	4.6
37	201	84.1	1.0	N	N	N	1	2	R	0	N	B	1	F	27	1.0	4.3
38	187	62.6	1.0	N	N	N	1	1	R	0	N	B	1	M	34	1.5	5.3
39	208	93.3	1.0	N	N	N	1	1	R	0	N	B	1	M	29	1.0	4.2
40	197	72.5	0.9	N	N	N	1	1	R	0	N	A	0	M	30	1.0	4.0
41	197	79.7	1.0	N	N	N	1	1	R	0	N	B	1	M	31	1.0	5.3
42	197	75	1.0	N	N	N	1	2	R	0	N	A	0	F	32	1.0	5.1
43	167	41.9	0.9	N	N	N	1	2	R	0	N	A	1	F	29	1.0	4.7
44	183	61.7	1.0	N	N	N	0	1	R	0	N	B	1	F	32	0.5	4.2
45	162	43.7	1.0	N	N	N	1	2	R	0	N	B	1	M	34	1.0	5.2
46	192	72.9	1.0	N	N	N	8	1	R	0	N	B	1	M	30	1.0	4.6
47	186	46.7	0.7	N	N	N	1	1	R	0	N	B	1	M	31	1.0	4.7
48	168	46.9	1.0	N	N	N	1	2	G	0	N	A	0	M	32	1.5	4.6
49	194	73	1.0	N	N	N	1	2	R	0	N	B	1	F	31	1.0	5.5
50	178	58	1.0	N	N	N	0	2	R	0	N	A	1	F	33	0.5	5.5
51	188	61.8	0.9	N	N	N	8	2	R	0	N	A	1	F	34	0.5	5.6
52	192	69.7	1.0	N	N	N	8	1	R	0	N	A	1	F	34	1.0	5.2
53	122			N	N	N	0	1	R	0	N	B	1	M	29	1.0	2.8
54	177			N	N	N	1	1	R	0	N	B	1	M	35	0.0	5.5
55	167			N	N	N	0	1	R	0	N	B	1	F	36	0.0	5.5
56	185			N	N	N	0	1	R	0	N	B	1	F	35	1.0	4.3
57	214			N	N	N	0	1	R	0	N	B	1	M	35	1.0	3.8
58	182			N	N	N	0	1	R	0	N	B	1	M	35	1.0	5.5
59	192			N	N	N	0	2	R	0	N	B	1	M	36	1.0	5.6
60	176			N	N	N	1	1	R	0	N	A	1	M	31	0.5	4.3

SUMMARY OF FISH AUTOPSY

LOCATION: Cowlitz

QUAL. CONTROL INSPECT. NO.: 821

Species: Chinook      Autopsy Date: 04/26/89      Sample Size: 60  
 Strain: Spring      Age: BY88      Tissue Collection No.: NA  
 Mark/Lot: NA      Water Temp.: 45 F      Disease Survey No.: NA  
 Unit: Pd8,9,12,14,15,17      Water Hardness: NA ppm      Case History No.: 821  
 Fish source: Cowlitz      Investigator: BR/PM/JH      Custody No.: NA  
 Egg Source: Cowlitz      Reason for Autopsy: Pre-Lib Exam  
 Hatching Date: NA  
 Remarks: Zero release lot

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	82.030 mm	6.15 mm	7%
Weight	5.270 gr	1.28 gr	24%
Ktl*	0.950	0.08	8%
Ctl**	3.432		
Hematocrit	37.330	3.54	9%
Leucocrit	0.770	0.47	61%
Serum Protein	4.150	0.83	20%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 100%	N 98%	N 98%	0 100%	0 10%	B 0%	0 100%	N 100%	A 0%	0 98%
B1 0%	F 0%	S 2%	1 0%	1 90%	R 90%	1 0%	S 0%	B 100%	1 2%
B2 0%	C 0%	L 0%	2 0%	2 0%	G 0%	2 0%	M 0%	C 0%	2 0%
E1 0%	M 0%	S&L 0%	x 0.0	3 0%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 2%	I 0%		4 0%	E 10%		U 0%	E 0%	x 0.0
H1 0%	OT 0%	OT 0%		x 0.9	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

100%	98%	98%	100%	90%	100%	100%	100%
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Summary of Means

		0.0	0.9	0.0		0.0
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SEX: M: 0% F: 40% U: 60%

GENERALREMARKS

FINS Normal

SKIN Normal

GONADS Development not sufficiently advanced to positively identify male

OTHER Very little visceral fat; trailing only along gut

Qual.Qual. Control N821 86-86

SN	LGH	WGT	Kt1	EYE	GILL	PSBR	THY	FAT,	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	90	7.2	1.0	N	N	N	0		E	0	N	B	0	U	44	1.0	6.0
2	76	4.4	1.0	N	N	N	0		R	0	N	B	0	U	40	0.0	4.1
3	79	5.2	1.1	N	N	N	0		R	0	N	B	0	U	42	1.0	3.6
4	84	5.6	0.9	N	N	N	0		R	0	N	B	0	U	42	0.5	4.2
5	79	3.5	0.7	N	N	N	0		R	0	N	B	0	U	44	1.0	1.8
6	78	3.9	0.8	N	N	N	0		R	0	N	B	0	U	44	1.0	4.3
7	70	3.7	1.1	N	N	N	0		R	0	N	B	0	U	44	1.0	3.8
8	74	4.7	1.2	N	N	N	0		R	0	N	B	0	U	35	0.0	3.3
9	74	3.3	0.8	N	N	S	0		R	0	N	B	0	U	36	1.0	2.4
10	79	4.4	0.0	N	N	N	0		R	0	N	B	0	U	34	0.0	4.2
11	83	5.8	1.0	N	N	N	0		R	0	N	B	0	U	34	0.0	4.4
12	87	6.3	1.1	N	N	N	0		R	0	N	B	0	U	36	0.5	4.3
13	85	6.3	1.1	N	N	N	0		R	0	N	B	0	U	35	0.0	2.7
14	86	5.9	0.0	N	N	N	0		R	0	N	B	0	U	32	1.0	
15	92	7.9	1.0	N	N	N	0		R	0	N	B	0	U	42	1.0	5.2
16	91	7.1	0.0	N	N	N	0		R	0	N	B	0	U	39	1.0	4.0
17	90	6.9	0.0	N	N	N	0		R	0	N	B	0	U	37	0.0	5.4
18	77	3.6	0.0	N	N	N	0		R	0	N	B	0	U	39	1.0	3.6
19	83	5.6	1.0	N	N	N	0		R	0	N	B	0	U	38	1.0	3.5
20	82	4.5	0.8	N	N	N	0		R	0	N	B	0	U	37	1.0	4.8
21	90	6.5	0.0	N	N	N	0		R	0	N	B	0	U	35	1.0	4.8
22	81	4.7	0.0	N	N	N	0		R	0	N	B	0	U	36	1.0	4.3
23	78	4.3	0.0	N	N	N	0		E	0	N	B	0	U	38	1.0	4.5
24	91	7.3	1.1	N	N	N	0		R	0	N	B	0	U	43	1.0	4.9
25	85	5.8	0.0	N	N	N	0		R	0	N	B	0	U	35	0.5	5.2
26	81	4.9	0.0	N	N	N	0		R	0	N	B	0	U	38	1.0	4.1
27	86	5.5	0.0	N	N	N	0		R	0	N	B	0	U	36	1.0	4.1
28	82	4.7	0.0	N	N	N	0		R	0	N	B	0	U	32	0.0	4.0
29	84	5.6	0.0	N	N	N	0		R	0	N	B	0	U	33	0.0	5.2
30	80	4.2	0.0	N	N	N	0		R	0	N	B	0	U	31	1.0	3.5
31	86	6.6	0.0	N	N	N	0		R	0	N	B	0	U	41	0.5	4.4
32	86	6.6	0.0	N	N	N	0		R	0	N	B	0	U	38	1.0	3.6
33	87	6.2	0.0	N	N	N	0		R	0	N	B	0	U	32	1.0	5.2
34	81	4.9	0.0	N	N	N	0		R	0	N	B	0	U	37	1.0	4.8
35	85	5.6	0.0	N	N	N	0		R	0	N	B	0	U	33	1.0	4.0
36	85	5.9	1.1	N	N	N	0		R	0	N	B	0	U	40	1.0	4.3
37	71	3.5	1.0	N	N	N	0		R	0	N	B	0	U	35	2.0	3.2
38	73	3.9	1.0	N	N	N	0		R	0	N	B	0	U	37	1.0	4.7
39	72	3.7	1.0	N	N	P	0		R	0	N	B	0	U	37	1.0	2.7
40	67	2.7	0.0	N	N	N	0		R	0	N	B	0	U	38	0.5	3.2
41	90	6.8	0.0	N	N	N	0		R	0	N	B	0	U	43	1.0	4.9
42	72	3.4	0.0	N	N	N	0		R	0	N	B	0	U	38	0.0	3.2
43	80	4.8	0.0	N	N	N	0		R	0	N	B	0	U	38	1.0	4.8
44	86	6.6	0.0	N	N	N	0		R	0	N	B	0	U	35	1.0	5.3
45	96	9.9	1.0	N	N	N	0		E	0	N	B	0	U	40	1.0	3.5
46	88	6.3	0.0	N	N	N	0		R	0	N	B	0	U	41	1.0	4.9
47	78	3.9	0.0	N	N	N	0		R	0	N	B	0	U	37	1.0	3.3
48	89	6.3	0.0	N	N	N	0		R	0	N	B	0	U	35	1.0	5.1
49	80	4.3	0.0	N	N	N	0		R	0	N	B	0	U	36	0.0	4.3
50	78	4.5	0.0	N	N	N	0		R	0	N	B	0	U	35	0.0	4.4
51	84	5.5	0.0	N	N	N	0		R	0	N	B	0	U	38	1.0	5.3
52	82	5.4	1.0	N	N	N	0		R	0	N	B	8	U	37	1.0	4.3
53	82	5.4	1.0	N	N	N	0		R	0	N	B	8	U	32	1.0	5.2
54	92	7.7	1.0	N	N	N	0		R	0	N	B	8	U	41	0.0	4.7
55	81	5.4	1.0	N	N	N	0		R	0	N	B	0	U	35	2.0	3.3
56	76	3.6	0.8	N	N	N	0		R	0	N	B	0	U	40	1.0	3.8
57	79	5.2	1.1	N	N	N	0		R	0	N	B	0	U	29	1.0	4.2
58	85	5.5	0.9	N	N	N	0		R	0	N	B	0	U	40	0.0	4.4
59	74	4.2	1.0	N	N	N	0		R	0	N	B	8	U	38	0.5	3.:
60	80	5.4	1.1	N	N	N	0		R	0	N	B	8	U	38	0.5	3.:

SUMMARY OF FISH AUTOPSY

LOCATION: Cowlitz QUAL. CONTROL INSPECT. NO.: 828  
**Species: Chinook** Autopsy Date: 06-12-89 Sample Size: 60  
**Strain: Fall** Age: BY88 Tissue Collection No.: NA  
 Mark/Lit: See remarks Disease Survey No.: NA  
 Unit: Pds 3,5,11,13,16 Water Temp.: 46 F Case History No.: 828  
 Fish Source: Cowlitz Water Hardness: NA ppm Custody No.: NA  
 Egg Source: Cowlitz Investigator: PM-BR  
 Hatching Date: NA Reason for Autopsy: Pre-Lib Exam  
 Remarks: CWT 63 52/50 R4

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	86.370 mm	8.47 mm	10%
Weight	5.480 gr	2 gr	37%
Ktl*	0.850	0.13	15%
Ctl**	3.071		
Hematocrit	36.830	3.3	9%
Leucocrit	0.520	0.4	76%
Serum Protein	5.030	0.61	18%

\*Expressed as Ktl times 10 to-the fifth power  
 \*\*Converted from Ktl: expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GI: &	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 100%	N 0%	N 98%	0 92%	7%	B 0%	0 100%	N 100%	A 20%	0 80%
B1 0%	F 0%	S 2%	1 8%	82%	R 100%	1 0%	S 0%	B 80%	1 20%
B2 0%	C 0%	L 0%	2 0%	12%	G 0%	2 0%	M 0%	C 0%	2 0%
E1 0%	M 0%	S&L 0%	x 0.1	0%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I 0%		0%	E 0%		U 0%	E 0%	x 0.2
H1 0%	OT 0%	OT 0%		x 1.1	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

100% | 100% | 98% | 92% | | 100% | 100% | 100% | 100%

Summary of Means

| | | 0.1 | 1.1 | | 0.0 | | | 0.2

SEX: M: 40% F: 42% U: 18%

GENERAL REMARKS

FINS Good  
 SKIN Good. No descaling.  
 GONADS NA  
 OTHER Used hatchery gram scale-Accurate only to 1.0g.

Qual.Qual. Control N828 86-8A

SN	LGH	WGT	Ktl	EYE	GILL	PSBR	THY	FAT	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	100	7.5	0.8	N	N	N	0	1	R	0	N	B	0	M	39	0.0	6.3
2	92	7.5	1.0	N	N	N	0	2	R	0	N	B	0	M	30	0.0	5.2
3	89	7.5	0.9	N	N	N	0	1	R	0	N	B	0	M	39	0.0	5.7
4	96	7.5	0.9	N	N	N	0	1	R	0	N	B	1	M	40	0.0	5.5
5	83	7.5	0.0	N	N	N	0	1	R	0	N	B	0	M	36	0.0	6.6
6	95	7.5	0.8	N	N	N	0	1	R	0	N	B	0	M	42	0.0	7.8
7	89	7.5	0.9	N	N	N	0	1	R	0	N	B	0	F	35	0.0	4.9
8	88	7.5	0.7	N	N	N	0	1	R	0	N	B	0	F	38	0.0	5.6
18	78	7.5	0.6	N	N	N	0	1	R	0	N	B	0	M	37	0.0	3.7
11	86	7.5	0.6	N	N	N	0	1	R	0	N	B	1	M	41	0.0	4.8
12	92	7.5	0.9	N	N	N	1	1	R	0	N	B	0	F	39	0.0	4.7
13	72	7.5	0.8	N	N	N	0	1	R	0	N	B	0	F	38	1.1	7.0
14	93	7.5	0.9	N	N	N	0	2	R	0	N	B	0	F	39	0.0	5.7
15	94	7.5	1.0	N	N	N	0	1	R	0	N	B	0	F	40	0.0	5.3
16	80	7.5	0.8	N	N	N	0	2	R	0	N	B	8	F	39	1.1	4.7
17	84	7.5	0.8	N	N	S	0	1	R	0	N	B	8	M	35	1.1	5.0
18	80	7.5	1.0	N	N	N	I	1	R	0	N	B	8	M	37	0.0	4.3
19	76	7.5	0.7	N	N	N	8	0	R	0	N	B	0	F	34	1.1	4.0
20	70	7.5	0.9	N	N	N	8	0	R	0	N	B	1	F	37	0.0	3.5
21	85	7.5	0.7	N	N	N	8	1	R	0	N	B	1	F	30	1.1	4.4
22	96	7.5	0.9	N	N	N	8	1	R	0	N	B	1	F	33	1.1	5.7
23	100	7.5	0.9	N	N	N	8	1	R	0	N	B	0	F	39	1.1	5.1
24	90	7.5	0.8	N	N	N	8	1	R	0	N	B	1	M	38	0.0	5.5
25	89	7.5	0.9	N	N	N	8	1	R	0	N	B	1	M	31	0.0	5.1
26	96	7.5	0.9	N	N	N	8	2	R	0	N	B	8	M	35	0.0	4.8
27	78	7.5	0.6	N	N	N	8	1	R	0	N	B	8	F	34	0.0	4.4
28	82	7.5	0.9	N	N	N	I	1	R	0	N	B	8	M	37	0.0	4.1
29	80	7.5	0.8	N	N	N	I	1	R	0	N	B	8	U	39	0.0	4.5
30	65	7.5	0.7	N	N	N	8	0	R	0	N	B	1	U	35	0.0	3.3
31	92	7.5	0.8	N	N	N	8	1	R	0	N	B	0	F	34	1.1	6.8
32	93	7.5	0.7	N	N	N	8	2	R	0	N	B	0	F	39	1.1	5.2
33	85	7.5	0.7	N	N	N	8	1	R	0	N	B	0	F	40	0.0	6.3
34	95	7.5	0.7	N	N	N	8	2	R	0	N	B	1	F	42	1.1	5.5
35	91	7.5	0.8	N	N	N	8	1	R	0	N	B	1	F	44	0.0	5.8
36	92	7.5	0.6	N	N	N	8	1	R	0	N	B	8	F	39	0.0	3.3
37	81	7.5	0.6	N	N	N	8	1	R	0	N	B	8	F	35	1.1	4.4
38	96	7.5	0.8	N	N	N	8	2	R	0	N	B	8	F	37	1.1	5.5
39	87	7.5	0.8	N	N	N	8	1	R	0	N	B	8	F	37	0.0	4.2
40	86	7.5	0.8	N	N	N	8	1	R	0	N	B	8	F	36	0.0	4.0
41	87	7.5	0.8	N	N	N	8	1	R	0	N	B	8	F	30	0.0	5.0
42	82	7.5	0.7	N	N	N	8	1	R	0	N	B	8	F	37	0.0	5.3
43	82	7.5	0.7	N	N	N	8	1	R	0	N	B	8	F	36	0.0	6.4
44	78	7.5	0.6	N	N	N	8	1	R	0	N	B	0	F	40	0.0	4.3
45	85	7.5	0.8	N	N	N	8	1	R	0	N	B	0	F	41	1.1	5.2
46	74	7.5	0.5	N	N	N	1	1	R	0	N	B	1	F	35	0.0	4.0
47	99	7.5	0.0	N	N	N	1	1	R	0	N	B	0	U	39	0.0	6.2
48	84	7.5	0.8	N	N	N	0	1	R	0	N	B	0	F	43	0.0	4.4
49	85	7.5	1.0	N	N	N	0	1	R	0	N	B	0	F	43	0.0	5.2
50	68	7.5	1.1	N	N	N	0	1	R	0	N	B	0	F	34	0.0	4.3
51	98	7.5	1.1	N	N	N	0	1	R	0	N	B	0	F	34	0.0	6.1
52	104	12	1.1	N	N	N	1	1	R	0	N	B	0	F	32	1.1	5.5
53	72	7.5	0.5	N	N	N	0	1	R	0	N	B	1	M	37	0.0	4.8
54	92	7.5	0.9	N	N	N	0	1	R	0	N	B	1	M	39	0.0	5.7
55	85	7.5	0.0	N	N	N	0	1	R	0	N	B	8	M	32	0.0	4.2
56	97	7.5	1.1	N	N	N	1	1	R	0	N	B	8	F	35	0.0	5.5
57	88	7.5	1.1	N	N	N	0	1	R	0	N	B	8	F	35	0.0	5.5
58	81	7.5	0.9	N	N	N	0	1	R	0	N	B	8	F	37	0.0	5.4
59	87	7.5	0.9	N	N	N	0	1	R	0	N	B	8	F	36	0.0	3.8
60	78	7.5	1.1	N	N	N	0	1	R	0	N	B	8	U	31	0.0	4.2

SUMMARY OF FISH AUTOPSY

LOCATION: Lyons Ferry QUAL. CONTROL INSPECT. NO.: 804  
**Species: Chinook** Autopsy Date: 03/01/89 Sample Size: 60  
**Strain: Falls** Age: BY87 Tissue Collection No.: NA  
 Mark/Lot: Yrlng Release Disease Survey No.: NA  
 Unit: Stds & Pds 29-30 Water Temp.: NA NA Case History No.: 804  
 Fish Source: Lyons Water Hardness: NA ppm Custody No.: NA  
 Egg Source: Lyons Investigator: PM/BR/PS  
 Hatching Date: NA Reason for Autopsy: Pre-lib exam  
 Remarks: Barge CWT6347/50,47/55. Station CWT6347/52,47/56

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	149.280 mm	12.05 mm	8%
Weight	28.110 gr	6.12 gr	22%
Ktl*	0.840	0.05	6%
Ctl**	3.035		
Hematocrit	38.930	4.21	11%
Leucocrit	1.310	0.79	60%
Serum Protein	3.010	0.8	27%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 97%	N 100%	N 88%	0 92%	0 10%	B 2%	0 100%	N 95%	A 0%	0 0%
B1 2%	F 0%	S 12%	1 7%	2 63%	R 82%	1 0%	S 5%	B 92%	1 68%
B2 0%	C 0%	L 0%	2 2%	2 23%	G 0%	2 0%	M 0%	C 8%	2 32%
E1 2%	M 0%	S&L 0%	x 0.1	2 0%	NE 17%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I 0%					U 0%	E 0%	x 1.3
H1 0%	OT 0%	OT 0%		x 1.2	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

97%	100%	88%	92%	83%	100%	95%	92%
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Summary of Means

		0.1	1.2	0.0			1.3
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SEX: M: 67% F: 33% U: 0%

GENERAL REMARKS

FINS Five fish with frayed/damaged caudals, one with eroded pectoral  
 SKIN NA  
 GONADS NA  
 OTHER Two kidneys with small pustules, nine fish with pink fat

Qual.Qual. Control N804 86-8A

SN	LGH	WGT	KtL	EYE	GILL	PSBR	THY	FAT	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	146	26.8	0.0	E	N	N	0	1	R	0	N	C	1	F	33	0.5	1.2
2	162	37.4	0.0	E	N	N	0	1	R	0	N	B	1	M	34	0.0	2.6
3	165	40.2	0.0	E	N	N	0	1	R	0	N	B	2	M	37	0.5	3.0
4	151	28.2	0.0	E	N	N	0	1	R	0	N	B	1	F	41	1.5	2.7
5	120	16.4	0.0	E	N	N	0	2	R	0	N	B	1	F	37	2.0	3.1
6	143	26.2	0.0	E	N	N	0	1	R	0	N	B	1	F	34	0.0	2.6
7	152	31.3	0.0	E	N	N	0	1	R	0	N	B	1	F	33	1.0	2.1
8	166	38.3	0.0	E	N	N	0	1	R	0	N	B	1	M	42	0.5	2.9
9	153	29.3	0.0	E	N	N	0	0	R	0	N	C	1	M	30	0.0	2.0
10	159	34.1	0.0	E	N	N	0	1	R	0	N	B	2	M	36	1.5	1.8
11	162	35.5	0.0	E	N	N	0	2	R	0	N	B	1	M	48	2.0	4.3
12	156	32.5	0.0	E	N	N	0	1	R	0	N	B	2	M	39	1.5	4.1
13	157	33.3	0.0	E	N	N	0	1	R	0	N	B	1	M	43	1.0	4.5
14	149	28.8	0.0	E	N	N	0	1	R	0	N	B	1	M	44	2.0	4.3
15	160	33.4	0.0	E	N	N	0	1	R	0	N	B	2	M	41	1.0	3.4
16	153	28.3	0.0	E	N	N	0	1	R	0	N	B	1	M	40	0.0	3.7
17	130	19.9	0.0	E	N	N	0	2	R	0	N	B	1	M	41	1.0	2.5
18	138	21.2	0.0	E	N	N	0	0	R	0	N	B	1	F	41	1.0	2.5
19	144	23.4	0.0	E	N	N	0	1	R	0	N	B	1	F	43	0.5	2.9
20	162	33.6	0.0	E	N	N	0	1	R	0	N	B	2	F	39	1.5	2.5
21	153	25.5	0.0	E	N	N	0	0	R	0	N	B	2	F	42	1.0	1.8
22	153	27.7	0.0	E	N	N	0	0	R	0	N	B	2	F	29	0.0	2.8
23	111	12.4	0.0	E	N	N	0	2	R	0	N	B	1	F	32	0.0	2.0
24	138	21.6	0.0	E	N	N	0	1	R	0	N	B	2	F	47	1.0	4.2
25	163	35.8	0.0	E	N	N	0	1	R	0	N	B	2	F	38	1.0	2.2
26	145	22.7	0.0	E	N	N	0	1	R	0	N	B	1	F	37	1.5	2.8
27	161	33.5	0.0	E	N	N	0	1	R	0	N	B	2	M	35	2.0	3.3
28	125	17.9	0.0	E	N	N	0	2	R	0	N	B	1	F	40	1.0	3.4
29	136	21.2	0.0	E	N	N	0	1	R	0	N	B	1	F	45	1.0	1.8
30	143	23.6	0.0	E	N	N	0	2	R	0	N	B	1	F	41	1.0	3.1
31	146	26.1	0.0	E	N	N	0	1	R	0	N	B	2	F	39	3.0	3.9
32	159	33.4	0.0	E	N	N	0	2	R	0	N	B	1	F	37	1.0	2.6
33	139	23.2	0.0	E	N	N	0	1	R	0	N	B	1	M	43	0.5	2.3
34	165	36.7	0.0	E	N	N	0	1	R	0	N	B	1	M	44	1.0	2.7
35	146	25.5	0.0	E	N	N	0	1	R	0	N	B	2	F	44	1.0	2.6
36	148	25.6	0.0	E	N	N	0	1	R	0	N	B	2	F	37	0.0	2.7
37	132	20.3	0.0	E	N	N	0	1	R	0	N	B	2	F	34	0.5	2.9
38	150	24.9	0.0	E	N	N	0	1	R	0	N	B	1	M	39	2.0	3.1
39	141	24.3	0.0	E	N	N	0	1	R	0	N	C	1	M	41	3.0	1.6
40	144	23.5	0.0	E	N	N	0	1	R	0	N	B	1	F	41	3.0	1.6
41	152	29.5	0.0	E	N	N	0	1	R	0	N	C	1	F	41	2.0	4.0
42	155	30.5	0.0	E	N	N	0	1	R	0	N	C	1	F	37	1.0	3.9
43	147	27.2	0.0	E	N	N	0	1	R	0	N	B	1	M	40	1.0	4.1
44	158	28.5	0.0	E	N	N	0	1	R	0	N	B	2	M	44	1.0	3.8
45	159	33.3	0.0	E	N	N	0	1	R	0	N	B	1	M	41	2.0	3.8
46	139	23.7	0.0	E	N	N	0	2	R	0	N	B	1	M	37	2.0	3.1
47	150	28.7	0.0	E	N	N	0	1	R	0	N	B	1	M	42	1.5	3.9
48	140	22.8	0.0	E	N	N	0	1	R	0	N	B	1	F	38	3.0	2.3
49	156	29.5	0.0	E	N	N	0	1	R	0	N	B	2	F	41	2.0	2.7
50	149	28.7	0.0	E	N	N	0	1	R	0	N	B	1	M	44	2.0	4.4
51	152	28.9	0.0	E	N	N	0	1	R	0	N	B	1	M	44	1.5	3.3
52	170	38.3	0.0	E	N	N	0	1	R	0	N	B	1	F	39	2.0	4.1
53	164	35.3	0.0	E	N	N	0	1	R	0	N	B	1	F	40	2.0	3.4
54	169	40.9	0.0	E	N	N	0	5	R	0	N	B	1	F	42	1.5	4.1
55	140	21.9	0.0	E	N	N	0	1	R	0	N	B	1	F	41	1.0	2.7
56	163	35.6	0.0	E	N	N	0	1	R	0	N	B	1	F	31	3.0	2.1
57	147	26.7	0.0	E	N	N	0	1	R	0	N	B	1	F	32	2.5	2.2
58	151	27.9	0.0	E	N	N	0	1	R	0	N	B	1	M	35	2.0	3.1
59	142	25.6	0.0	E	N	N	0	1	R	0	N	B	1	M	35	2.0	3.1
60	128	19.9	0.0	E	N	N	0	1	R	0	N	B	1	M	35	2.0	3.1

SUMMARY OF FISH AUTOPSY

LOCATION: Lyons Ferry

QUAL. CONTROL INSPECT. NO.: 831

Species: Chinook      Autopsy Date: 05-23-89      Sample Size: 60  
 Strain: Fall      Age: BY88      Tissue Collection No.: NA  
 Mark/Lot: CWT      Disease Survey No.: NA  
 Unit: Pd 15,16 sample      Water Temp.: NA NA      Case History No.: 831  
 Fish Source: Lyons      Water Hardness: NA ppm      Custody No.: NA  
 Egg Source: Lyons      Investigator: BR/JH  
 Hatching Date: NA      Reason for Autopsy: Pre-lib Exam  
 Remarks: Barge CWT6352/07,52/04 R6. Station 6302/28,02/26 R6

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	82.430 mm	8.52 mm	10%
Weight	4.640 gr	1.62 gr	35%
Ktl*	0.830	0.06	8%
Ctl**	2: 999		
Hematocrit	36.350	4.85	13%
Leucocrit	0.910	0.4	44%
Serum Protein	3.740	0.77	21%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	100%	N	100%	N	100%	O	100%	O	0%	B	10%	O	100%	N	100%	A	0%	O	12%
B1	0%	F	0%	S	0%	1	0%	1	47%	R	90%	1	0%	M	0%	B	98%	1	73%
B2	0%	C	0%	L	0%	2	0%	2	53%	G	0%	2	0%	G	0%	C	0%	2	15%
E1	0%	M	0%	S&L	0%	x	0.0	3	0%	NO	0%	x	0.0	U	0%	D	0%	3	0%
E2	0%	P	0%	I	0%			4	0%	E	0%			O	0%	E	0%	x	1.0
H1	0%	OT	0%	OT	0%			x	1.5	OT	0%			OT	0%	F	0%		
H2	0%															OT	28		
M1	0%																		
M2	0%																		
OT	0%																		

Summary of Normals

100%	100%	100%	100%	100%	100%	100%	100%	98%
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Summary of Means

		0.0	1.5	0.0			1	0
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SEX: M: 50% F: 50% U: 0%

GENERAL REMARKS

FINS Good fins. Particulate matter on gills.  
 SKIN Scale loss minimal.  
 GONADS NA  
 OTHER Fat levels barely a "2". Small fish very thin.

Qual.Qual. Control N831 86-8A

SN	LGH	WGT	Ktl	EYE	GILL	PSBR	THY	FAT	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	86	4.8	0.8	N	N	N	0	?	R	0	N	B	2	F	39	0.0	3.6
2	76	3.6	0.8	N	N	N	0	1	R	0	N	B	0	F	40	0.5	3.8
3	98	8.4	0.9	N	N	N	0	2	R	8	N	B	2	M	37	1.0	4.9
4	89	6.6	0.9	N	N	N	0	1	R	0	N	B	2	M	38	1.0	4.3
5	83	4.6	0.8	N	N	N	0	1	R	0	N	B	1	F	37	0.0	4.4
6	72	2.6	0.7	N	N	N	0	1	R	0	N	B	1	F	32	1.5	2.4
7	78	4.4	0.8	N	N	N	0	2	R	0	N	B	0	F	40	1.0	5.0
8	75	3.1	0.7	N	N	N	0	2	R	0	N	B	1	F	43	0.0	2.5
9	99	7.4	0.8	N	N	N	0	1	R	8	N	B	1	F	41	1.0	3.0
10	92	6.5	0.8	N	N	N	0	2	R	8	N	B	1	F	38	1.5	4.0
11	83	5.4	0.9	N	N	N	0	2	R	8	N	B	1	F	39	1.0	3.8
12	78	3.5	0.7	N	N	N	0	1	R	0	N	B	1	F	29	0.0	3.4
13	80	3.9	0.8	N	N	N	0	1	R	0	N	B	1	F	32	1.5	3.8
14	77	3.8	0.8	N	N	N	0	1	R	0	N	B	1	M	37	1.0	3.9
15	83	4.7	0.8	N	N	N	0	2	R	8	N	B	1	M	46	1.0	3.1
16	77	3.4	0.7	N	N	N	0	2	R	0	N	B	1	M	49	1.0	3.8
17	67	1.9	0.6	N	N	N	0	1	R	0	N	B	1	M	26	0.5	2.3
18	70	2.5	0.7	N	N	N	0	1	R	8	N	B	1	M	31	1.0	3.8
19	70	2.4	0.7	N	N	N	0	1	R	0	N	B	1	M	29	1.0	3.6
20	83	5.1	0.9	N	N	N	0	2	R	8	N	B	1	M	33	1.0	3.2
21	102	8.4	0.8	N	N	N	0	1	B	0	N	B	1	F	31	1.0	4.0
22	80	4.4	0.9	N	N	N	0	2	R	0	N	B	1	F	34	0.5	3.6
23	82	4.6	0.8	N	N	N	0	2	R	0	N	B	2	F	32	1.0	5.5
24	71	3.1	0.9	N	N	N	0	1	R	0	N	B	1	M	32	1.0	5.6
25	80	3.4	0.8	N	N	N	0	1	R	0	N	B	2	M	31	1.0	3.3
26	93	7.7	0.9	N	N	N	0	2	R	8	N	B	1	M	41	1.5	4.0
27	87	5.6	0.9	N	N	N	0	2	R	8	N	B	1	M	43	1.1	3.9
28	93	6.7	0.8	N	N	N	0	2	B	8	N	B	0	M	39	0.0	4.4
29	93	7.7	0.9	N	N	N	0	2	R	0	N	B	1	M	40	0.5	4.4
30	72	2.6	0.7	N	N	N	0	1	R	8	N	B	1	F	27	1.1	1.9
31	99	8.8	0.8	N	N	N	0	2	R	8	N	B	1	M	36	1.0	4.1
32	76	4.4	0.9	N	N	N	0	2	R	8	N	B	0	M	39	1.1	3.3
33	88	5.3	0.8	N	N	N	0	2	R	0	N	B	1	F	38	1.0	3.9
34	85	4.9	0.8	N	N	N	0	1	B	0	N	B	0	F	42	1.1	3.8
35	65	2.1	0.8	N	N	N	0	1	R	8	N	B	1	F	36	0.5	5.0
36	82	4.4	0.7	N	N	N	0	1	R	8	N	B	1	F	43	0.0	4.4
37	79	3.8	0.8	N	N	N	1	1	R	0	N	B	1	F	35	1.1	3.9
38	82	4.2	0.8	N	N	N	0	1	R	0	N	B	1	F	43	0.0	4.5
39	83	4.3	0.8	N	N	N	0	1	R	0	N	B	1	F	39	1.1	3.3
40	85	4.5	0.8	N	N	N	0	2	R	8	N	B	1	M	39	1.0	3.9
41	84	4.1	0.7	N	N	N	0	2	R	8	N	B	1	F	28	0.0	3.0
42	80	4.1	0.8	N	N	N	8	2	R	8	N	B	1	F	37	1.1	3.4
43	92	6.4	0.8	N	N	N	8	1	R	8	N	B	0	F	41	0.0	4.7
44	77	4.1	0.9	N	N	N	8	1	R	8	N	B	1	F	34	0.0	4.3
45	95	7.5	0.9	N	N	N	0	1	R	0	N	B	2	M	35	1.0	4.4
46	73	3.3	0.8	N	N	N	8	2	R	0	N	B	1	M	39	1.1	4.0
47	86	5.2	0.8	N	N	N	8	2	R	8	N	B	1	M	41	0.0	4.4
48	71	2.8	0.8	N	N	N	8	2	R	8	N	B	0	M	41	1.1	4.4
49	72	2.4	0.6	N	N	N	8	2	R	8	N	B	1	M	33	1.1	1.9
50	77	3.3	0.7	N	N	N	0	1	B	0	N	B	2	M	34	1.1	3.0
51	77	3.5	0.8	N	N	N	0	1	B	8	N	B	1	M	37	1.1	3.9
52	77	3.5	0.8	N	N	N	0	1	B	8	N	B	1	M	36	0.0	4.2
53	91	5.9	0.8	N	N	N	0	2	B	8	N	B	1	M	37	0.5	4.4
54	92	6.7	0.8	N	N	N	0	2	B	0	N	B	1	M	38	1.1	3.6
55	81	4.1	0.8	N	N	N	0	1	R	0	N	B	1	M	38	1.1	4.4
56	99	7.5	0.8	N	N	N	0	2	R	0	N	B	1	F	37	1.1	3.4
57	77	3.4	0.7	N	N	N	0	1	R	0	N	B	1	F	39	1.1	4.4
58	80	4.4	0.8	N	N	N	0	2	R	0	N	B	1	F	32	1.1	3.6
59	83	4.3	0.8	N	N	N	0	2	R	0	N	B	1	F	28	1.1	3.8
60	84	4.8	0.8	N	N	N	0	2	R	0	N	B	2	F	39	1.0	3.7

SUMMARY OF FISH AUTOPSY

LOCATION: Lewis River QUAL. CONTROL INSPECT. NO.: 801  
 Species: Coho Autopsy Date: 02/21/89 Sample Size: 60  
 Strain: Early & Late Age: BY87 Tissue Collection No.: NA  
 Mark/Lot: CWT 63 52/56 Disease Survey No.: NA  
 Unit: Ponds 13-15 Water Temp.: 40 F Case History No.: 801  
 Fish Source: Lewis Water Hardness: NA ppm Custody No.: NA  
 Egg Source: Lewis Investigator: BR/PM/JH/PC  
 Hatching Date: NA Reason for Autopsy: Pre-lib exam  
 Remarks: ECoho #1-30 Pd 15. LCoho #31-60 Pds 13-14

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	114.920 mm	11.7 mm	10%
Weight	13.610 gr	4.07 gr	30%
Ktl*	0.900	0.03	4%
Ctl**	3.252		
Hematocrit	32.380	2.81	9%
Leucocrit	1.080		57%
Serum Protein	4.640	8. %	14%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 98%	N 100%	N 100%	O 100%	0 0%	B 2%	0 100%	N 98%	A 0%	0 32%
B1 0%	F 0%	S 0%	1 0%	1 12%	R 98%	1 0%	S 0%	B100%	1 67%
B2 0%	C 0%	L 0%	2 0%	75%	G 0%	2 0%	M 2%	C 0%	2 2%
E1 0%	M 0%	S&L 0%	x 0.0	3 13%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I 0%		4 0%	E 0%		U 0%	E 0%	x 0.7
H1 2%	OT 0%	OT 0%		x 2.0	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

98%	100%	100%	100%	100%	100%	98%	100%
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Summary of Means

0.0	2.0	0.0	0.7
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SEX: M: 47% F: 53% U: 0%

GENERAL REMARKS

FINS Four fish with short/missing pectorals  
 SKIN Well smolted, easily descaled.  
 GONADS NA  
 OTHER Four fish with pink fat

Qual.Qual. Control N801 86-8A

SN	LGH	WGT	Kt1	EYE	GILL	PSBR	THY	FAT	SPL	GUT	KID	LIV	BILE	SEX	HEM	LEU	SPR
1	130	21.4	1.0	N	N	N	0	2	R	8	N	B	2	F	34	0.0	5.6
2	123	16.8	0.9	N	N	N	0	2	R	0	N	B	0	F	27	1.5	5.1
3	111	11.6	0.8	N	N	N	0	2	R	0	N	B	1	F	33	2.0	5.0
4	121	14.9	0.8	N	N	N	0	2	R	0	N	B	1	F	30	1.0	4.0
5	129	18.8	0.9	N	N	N	0	2	R	0	N	B	1	F	35	1.0	4.9
6	128	17.4	0.8	N	N	N	0	2	B	0	N	B	1	F	32	1.5	5.0
8	129	17.9	0.8	N	N	N	0	3	R	0	N	B	1	M	32	1.0	4.6
	91	6.4	0.8	N	N	N	0	1	R	0	N	B	0	F	30	1.0	3.5
9	115	13.3	0.9	N	N	N	0	2	R	0	N	B	1	M	28	1.0	3.7
10	122	16.8	0.9	N	N	N	0	2	R	0	N	B	0	M	33	1.0	3.9
11	124	17.1	0.9	N	N	N	0	0	R	0	N	B	1	M	30	1.0	4.6
12	124	17.5	0.9	N	N	N	0	3	R	0	N	B	1	M	34	1.5	5.5
13	124	15.8	0.8	N	N	N	0	2	R	0	N	B	1	F	32	1.0	4.4
14	119	13.8	0.8	N	N	N	0	2	R	0	N	B	1	F	28	1.0	4.4
15	140	22.8	0.8	N	N	N	0	2	R	0	N	B	1	F	36	1.0	4.6
16	120	15	0.9	N	N	N	0	2	R	0	N	B	1	F	31	1.0	4.2
17	120	15.4	0.9	N	N	N	0	2	R	0	N	B	1	F	28	1.0	4.6
18	114	13	0.9	N	N	N	0	2	R	0	N	B	0	F	31	1.5	4.5
19	117	13.4	0.8	N	N	N	0	2	R	0	N	B	0	M	33	2.0	3.9
20	129	19.7	0.9	N	N	N	0	0	R	0	N	B	1	F	38	1.0	4.6
21	131	19.3	0.9	N	N	N	0	3	R	0	N	B	1	F	31	1.0	5.1
22	131	18.6	0.8	N	N	N	0	2	R	0	N	B	1	M	31	1.0	5.1
23	139	22.6	0.8	N	N	N	0	3	R	0	N	B	1	F	36	1.0	5.5
24	119	14.4	0.9	N	N	N	0	2	R	0	N	B	1	M	33	2.0	5.0
25	103	9.3	1.1	0.9	N	N	0	2	R	0	N	B	1	M	30	1.5	4.9
26	108	12.4	0.8	0.8	N	N	0	2	R	0	N	B	1	M	29	2.0	3.7
28	128	18.2	0.9	0.9	N	N	0	2	R	0	N	B	1	M	34	0.0	4.1
29	130	18.7	0.9	0.9	N	N	0	3	R	0	N	B	1	M	33	1.0	5.1
30	131	19.8	0.9	0.9	N	N	0	2	R	0	N	B	1	M	36	1.0	5.1
31	111	11.7	0.9	0.9	N	N	0	2	R	0	N	B	1	M	35	0.0	4.2
32	99	8.9	0.9	0.9	N	N	0	2	R	0	N	B	0	F	32	0.5	3.8
33	103	9.6	0.9	0.9	N	N	0	2	R	0	N	B	1	F	31	0.0	4.1
34	94	7.4	0.9	0.9	N	N	0	2	R	0	N	B	1	F	32	0.0	5.3
35	96	7.7	0.9	0.9	N	N	0	1	R	0	N	B	1	F	32	1.0	4.4
36	103	9.4	0.9	0.9	N	N	0	2	R	0	N	B	8	F	31	0.0	4.7
37	106	10.4	0.9	0.9	N	N	0	2	R	0	N	B	1	F	30	0.5	5.0
38	105	9.9	0.9	0.9	N	N	0	2	R	0	N	B	0	M	33	1.0	3.6
40	104	12.2	0.8	0.8	N	N	0	2	R	0	N	B	0	M	32	1.0	4.8
	10	10	0.9	0.9	N	N	0	3	R	0	N	B	1	M	33	2.0	4.1
41	111	11.7	0.9	0.9	N	N	0	2	R	0	N	B	0	M	43	0.0	5.3
42	113	12.5	0.9	0.9	N	N	0	2	R	0	N	B	1	M	33	2.0	5.3
43	107	10.6	0.9	0.9	N	N	0	2	R	0	N	B	1	M	34	1.0	4.0
44	95	7.4	0.9	0.9	N	N	0	1	R	0	N	B	0	F	35	1.0	3.9
45	104	9.9	0.9	0.9	N	N	0	1	R	0	N	B	0	F	31	1.5	4.7
46	105	9.8	0.8	0.8	N	N	0	2	R	0	N	B	1	F	28	2.0	3.0
47	102	9.5	0.9	0.9	N	N	0	2	R	0	N	B	1	M	31	1.0	4.2
48	128	18	0.9	0.9	N	N	0	2	R	0	N	B	1	M	32	2.0	5.2
49	116	12.9	0.8	H	N	N	0	3	R	0	N	B	1	M	28	1.0	4.0
50	116	13.6	0.9	0.9	N	N	0	2	R	0	N	B	1	M	37	0.0	5.6
51	107	10.2	0.8	0.8	N	N	0	2	R	0	N	B	1	M	34	0.0	6.2
52	106	11	0.9	0.9	N	N	0	2	R	0	N	B	0	M	38	0.0	5.5
53	109	11.4	0.9	0.9	N	N	0	1	R	0	N	B	0	F	33	1.0	4.7
54	111	12.1	0.9	0.9	N	N	0	1	R	0	N	B	1	F	33	1.0	5.6
55	128	18.4	0.9	0.9	N	N	0	2	R	0	N	B	1	F	32	2.0	5.4
56	107	11	0.9	0.9	N	N	0	1	R	0	N	B	1	F	33	2.5	5.1
57	115	14.1	0.9	0.9	N	N	0	3	R	0	N	B	8	M	35	1.0	5.2
58	95	8.1	0.9	0.9	N	N	0	2	R	0	N	B	0	F	30	1.0	5.8
59	106	11	0.9	0.9	N	N	0	2	R	0	N	B	0	F	32	1.0	5.5
60	113	12.8	0.9	0.9	N	N	0	2	R	0	N	B	1	F	31	2.0	5.3

## SUMMARY OF FISH AUTOPSY

LOCATION: Lewis River

QUAL. CONTROL INSPECT. NO.: 801a

Species: Coho                      Autopsy Date: 02-21-89                      Sample Size: 30  
 Strain: Early                      Age: BY87                      Tissue Collection No.: NA  
 Mark/Lot: CWT 63 52/56                      Disease Survey No.: NA  
 Unit: Pd 15                      Water Temp.: 40 F                      Case History No.: 801a  
 Fish Source: Lewis                      Water Hardness: NA ppm                      Custody No.: NA  
 Egg Source: Lewis                      Investigator: BR/PM/JH/PC  
 Hatching Date: NA                      Reason for Autopsy: Pre-lib exam  
 Remarks: Thirty (30) E.Coho sample from Pd 15

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	122.170 mm	10.11 mm	8%
Weight	16.100 gr	3.75 gr	23%
Ktl*	0.880	0.04	4%
Ctl**	3.179		
Hematocrit	31.970	2.66	8%
Leucocrit	1.170	0.47	40%
Serum Protein	4.570	0.54	12%

\*Expressed as Ktl times 10 to the fifth power

\*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

## VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 100%	N 100%	N 100%	0 100%	0 0%	B 3%	0 100%	N 100%	A 0%	0 17%
B1 0%	F 0%	S 0%	1 0%	1 3%	R 97%	1 0%	S 0%	B100%	1 80%
B2 0%	C 0%	L 0%	2 0%	2 80%	G 0%	2 0%	M 0%	C 0%	2 3%
E1 0%	M 0%	S&L 0%	x 0.0	3 17%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I 0%		4 0%	E 0%		U 0%	E 0%	x 0.9
H1 0%	OT 0%	OT 0%		x 2.1	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

## Summary of Normals

100%	100%	100%	100%	100%	100%	100%	100%
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## Summary of Means

0.0	2.1	0.0	0.9
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SEX: M: 43% F: 57% u: 0%

## GENERAL REMARKS

FINS Two fish with short/missing pectorals

SKIN Well smolted, easily descaled

GONADS NA

OTHER Three fish with pink fat



SUMMARY OF FISH AUTOPSY

LOCATION: Lewis River

QUAL. CONTROL INSPECT. NO.: 801b

Species: Coho                      Autopsy Date: 02-21-89                      Sample Size: 30  
 Strain: Late                      Age: BY87                      Tissue Collection No.: NA  
 Mark/Lot: NA                      Disease Survey No.: NA  
 Unit: Pds 13-14                      Water Temp.: 40 F                      Case History No.: 801b  
 Fish Source: Lewis                      Water Hardness: NA ppm                      Custody No.: NA  
 Egg Source: Lewis                      Investigator: BR/PM/JH/PC  
 Hatching Date: NA                      Reason for Autopsy: Pre-lib exam  
 Remarks: Thirty (30) L.Coho sample from ponds 13-14

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	107.670 mm	8.15 mm	8%
Weight	11.110 gr	2.55 gr	23%
Ktl*	0.890	0.03	3%
Ctl**	3.215		
Hematocrit	32.800	2.88	9%
Leucocrit	1.000	0.73	73%
Serum Protein	4.710	0.73	15%

\*Expressed as Ktl times 10 to the fifth power  
 \*\*Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN. FAT	SPLEEN	HIND GUT	KIDNEY	LIVER	BILE
N 97%	N 100%	N 100%	0 100%	0 0%	B 0%	0 100%	N 100%	A 0%	0 47%
B1 0%	F 0%	S	1 0%	1 20%	R 100%	1 0%	S 0%	B 100%	1 53%
B2 0%	C 0%	L 82	2 0%	2 70%	G 0%	2 0%	M 0%	c 03	0 0%
E1 0%	M 0%	S&L	x 0.0	3 10%	NO 0%	x 0.0	G 0%	D 0%	3 0%
E2 0%	P 0%	I		4 0%	E 0%		U 0%	E 0%	x 0.5
H1 3%	OT 0%	OT		x 1.9	OT 0%		OT 0%	F 0%	
H2 0%								OT 0%	
M1 0%									
M2 0%									
OT 0%									

Summary of Normals

97%	100%	100%	100%	100%	100%	100%	100%	100%
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Summary of Means

0.0	1.9	0.0	0.5
-----	-----	-----	-----

SEX: M: 50% F: 50% u: 0%

GENERAL REMARKS

FINS Three fish with short/missing pectorals  
 SKIN Well smolted, easily descaled  
 GONADS NA  
 OTHER One fish with pink fat



## APPENDIX E

Appendix E contains the Hatchery Rearing Parameters and Mortality Summary Report. Data are presented by location; sorted by species, stock and brood. Data are from January 1, 1989 to December 31, 1989.

### Abbreviations:

Brood = A - adults returning in 1989.

Brood = 89 - eggs taken in 1989.

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**WDF PROGRAM QC02**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
**May 04, 1990**

Location: Coultr

SPECIES	STOCK	BROOD MTH	* DATE OF FISH YEAR ON HAND	POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW GPM	LBS PER CPM	FLOW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTLY
Fall	Coulitz	88	Feb 1989	10195	800.	162000	5500	1.85	1.3	0.04	-0-	9400
Fall	Coulitz	88	Mar 1989	24085	343.	144000	11000	2.19	1.	0.08	0.	7200
Fall	Coulitz	88	Apr 1989	51083	159.	144000	20000	2.55	0.9	0.13	1.2	15200
Fall	Coulitr	88	May 1989	74502	97.	144000	24000	3.1	1.1	0.18	0.	24100
Fall	Coulitr	88	Jun 1989	4700	41.	144000	4000	1.17	0.3	E-2	0.	2300
Fall	Coulitr	88	Jun 1989	112740	64.	144000	20000	5.64	1.7	0.23	1.3	11200
Fall	Cowlitz	88	Jul 1989	4588	42.	33000	4000	1.15	0.3	0.04	0.	2300
Fall	Coulitr	88	Aug 1989	8182	23.	32000	4000	2.05	0.4	0.05	1.4	4500
Fall	Coulitz	88	Sep 1989	13071	14.	33000	4000	3.27	0.6	0.07	1.2	5200
Late	Coulitz	87	Jan 1989	163256	30.	179000	22800	7.16	1.6	0.21	4.4	10400
Late	Coulitz	87	Feb 1989	195560	25.	179000	22800	8.58	2.	0.26	0.	8700
Late	Coulitz	87	Mar 1989	227490	21.	179000	22800	9.98	2.	0.26	1.6	111700
Late	Coulitz	87	Apr 1989	231770	20.	166000	20000	11.6	2.2	0.27	10.	141900
Late	Coulitz	87	May 1989	56725	16.	32000	2000	28.4	5.1	0.32	0.	50900
Late	Coulitz	87	Jun 1989	56693	16.	32000	4000	14.2	2.5	0.32	EI	500
Late	Coulitz	88	May 1989	27346	293.	113000	15200	1.8	0.8	0.11	0.	63500
Late	Coulitz	88	Jun 1989	47098	160.	193000	16500	2.85	1.2	0.1	1.1	70700
Late	Cowlitz	88	Jul 1989	74520	85.	200000	30000	2.48	0.8	0.12	0.	25000
Late	Coulitz	88	Aug 1989	102136	55.	174000	21500	4.75	1.4	0.17	0.	8100
Late	Coulitz	88	Sep 1989	100077	49.	153000	18500	5.41	1.5	0.18	0.	40800
Late	Coulitz	88	Oct 1989	109861	44.	153000	18500	5.94	1.6	0.19	3.5	55100
Late	Coulitz	88	Nov 1989	129986	37.	153000	18500	7.03	1.7	0.21	1.8	24400
Late	Coulitz	88	Dec 1989	144772	33.	153000	18500	7.83	1.9	0.22	2.7	32000
Spring	Coulitz	87	Jan 1989	59045	11.	144000	18000	3.28	0.5	0.07	1.3	2200
Spring	Coulitz	87	Feb 1989	80937	8.	144000	18000	4.5	0.7	0.09	0.9	2000
Spring	Coulitz	87	Mar 1989	88369	7.3	1440000	18000	4.91	0.7	E-2	3.3	2400
Spring	Cowlitz	87	Apr 1989	80475	8.	144000	18000	4.47	0.7	0.08	-1	1300
Spring	Coulitz	88	Jan 1989	9622	380.	100000	10000	0.96	0.5	0.05	0.	33200
Spring	Coulitz	88	Feb 1989	12121	300.	84000	10000	1.21	0.6	0.07	0.	20200
Spring	Coulitz	88	Mar 1989	26814	135.	90000	10000	2.68	1.	0.11	0.9	16300
Spring	Coulitz	88	Apr 1989	36830	98.	90000	12000	3.07	1.	0.14	1.2	10600
Spring	Cowlitz	88	May 1989	18532	65.	150000	20000	0.93	0.3	0.04	0.	22200
Spring	Coulitz	88	Jun 1989	26677	45.	150000	20000	1.33	0.4	0.05	1.5	4100
Spring	Cowlitz	88	Jul 1989	31342	38.	165000	22000	1.42	0.4	0.05	2.4	7500
Spring	Coulitz	88	Aug 1989	40793	29.	165000	22000	1.85	0.4	0.06	2.5	8000
Spring	Coulitz	88	Sep 1989	55750	20.	165000	22000	2.53	0.5	0.07	1.2	20400
Spring	Coulitz	88	Oct 1989	61383	18.	153000	22000	2.79	0.5	0.08	5.4	10100
Spring	Coulitz	88	Nov 1989	91700	12.	153000	22000	4.17	0.7	0.1	0.8	4500
Spring	Coulitz	88	Dec 1989	109340	10.	153000	22000	4.97	0.8	0.11	1.7	7000
Spring	Coulitz	89	Dec 1989	4338	456.	48000	2100	2.07	1.2	0.05	-0-	8500

**WDF PROGRAM QC02**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
 May 04, 1990

Location: Elokomin

SPECIES	STOCK	• DATE •		POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW GPM	LBS PER CPM	FLW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY	
		BROOD MTH	YEAR										
Early	Elokomin	88	Feb	1989	523	850.	4000	270	1.94	2.	0.13	0.	1203
Early	Elokomin	88	Mar	1989	1355	400.	7000	540	2.51	1.5	0.11	0.	2302
Early	Elokomin	88	Apr	1989	2322	231.	14000	4080	0.57	0.3	0.09	0.9	5535
Early	Elokanin	88	May	1989	3680	131.	29000	2160	1.7	0.6	0.05		972
Early	Elokomin	88	Jun	1989	4423	109.	36000	2700	1.64	0.6	0.04	8:	383
Early	Elokanin	88	Jul	1989	6249	77.	36000	2700	2.31	0.7	0.05		296
Early	Elokomin	88	Aug	1989	8440	57.	4000	2700	3.13	0.9	0.6	0%	784
Early	Elokomin	88	Sep	1989	9413	51.	36000	2700	3.49		0.07	2.2	227
Early	Elokomin	88	Oct	1989	12634	38.	36000	2500	5.05	1";	0.09	0.	86
Early	Elokomin	88	Nov	1989	16555	29.	36000	2600	6.37	1.5	0.11	0.	45
Early	Elokomin	88	Dec	1989	15963	30.	22000	3000	5.32	1.2	0.17	0.8	1200
Early	Grays River	87	Jan	1989	7434	29.	18000	1350	5.51	1.2	0.09	0.	200
Early	Grays River	88	Feb	1989	1077	493.	6000	540	1.99	1.7	0.15	-0-	1700
Early	Grays River	88	Mar	1989	2324	227.	14000	1080	2.15	1.	0.08	0.7	3488
Early	Grays River	88	Apr	1989	3737	140.	14000	1080	3.46	1.3	0.1	0.9	4187
Early	Grays River	88	May	1989	5870	89.	22000	1620	3.62	1.2	0.09	0.7	857
Early	Grays River	88	Jun	1989	5756	78.	36000	2700	2.13	0.7	0.05	0.	709
Early	Grays River	88	Jul	1989	7466	60.	36000	2700	2.77	0.8	0.06	1.	422
Early	Grays River	88	Aug	1989	8611	52.	4000	2700	3.19	0.9	0.59	1.2	677
Early	Grays River	88	Sep	1989	10154	44.	36000	2700	3.76	0.	0.07	1.	352
Early	Grays River	88	Oct	1989	11747	38.	36000	2500	4.7	1.2	0.08	1.3	350
Early	Grays River	88	Nov	1989	14374	31.	36000	2600	5.53	1.3	0.09	0.8	103
Early	Grays River	88	Dec	1989	14820	30.	36000	2500	5.93	1.4	0.1	4.6	1000
Early	Kalama Falls	88	Feb	1989	583	1020.	4000	270	2.16	2.2	0.15	-0-	4450
Early	Kalama Falls	88	Mar	1989	1176	449.	4000	270	4.36	2.6	0.17	0.	1792
Fall	Elokomin	88	Jan	1989	6864	649.	36000	2700	2.54	1.8	0.13	0.	14883
Fall	Elokomin	88	Feb	1989	10890	415.	60000	4810	2.26	1.3	0.1	0.	5846
Fall	Elokomin	88	Mar	1989	19887	224.	78000	8190	2.43	1.1	0.11	1.2	3806
Fall	Elokomin	88	Apr	1989	37883	116.	78000	8490	4.46	1.6	0.17	1.	38363
Fall	Elokomin	88	May	1989	60573	60.	109000	7770	7.8	2.3	0.16	0.	19455
Fall	Elokomin	88	Jun	1989	60498	60.	109000	7770	7.79	2.3	0.17	-1	4494
Fall	Elokomin	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	867100
Fall	Elokomin	89	Dec	1989	1145	969.	7000	200	5.72	5.8	0.17	-0-	628
Fall	Elokomin	A	Dec	1989	-0-	-0-	22000	4000	-0-	-0-	-0-	-0-	1509
Late	Elokomin	87	Jan	1989	69596	26.	136000	9900	7.03	1.5	0.11	0.	1500
Late	Elokomin	87	Feb	1989	72720	25.	136000	9900	7.35	1.6	0.12	0.	1570
Late	Elokomin	87	Mar	1989	86514	21.	139000	12200	7.09	1.5	0.13	0.8	1277
Late	Elokomin	87	Apr	1989	106770	17.	139000	12200	8.75	1.6	0.14	0.	1533
Late	Elokomin	87	May	1989	45500	17.	53000	6300	7.22	1.4	0.16	0.	810
Late	Elokomin	88	Mar	1989	1882	619.	11000	810	2.32	2.	0.14	0.	1414
Late	Elokanin	88	Apr	1989	3570	325.	14000	1080	3.31	1.8	0.14	1.	4679
Late	Elokomin	88	May	1989	6150	187.	82000	4850	1.27	0.5	0.03	1.	13389
Late	Elokomin	88	Jun	1989	8299	144.	117000	6422	1.29	0.5	0.03	0.	1755

**WDF PROGRAM QC02**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
**May 04, 1990**

Location: Elokomin

SPECIES	STOCK	BROOD	DATE	MONTH	YEAR	POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW CPM	LBS PER CPM	FLOW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
Late	Elokomin	88	Jul	1989		13124	91.	117000	6422	2.04	0.7	0.04	1.1	778
Late	Elokomin	88	Aug	1989		22520	53.	117000	6422	3.51	0.	0.05	0.8	910
Late	Elokomin	88	Sep	1989		24342	49.	117000	5400	4.51	1.2	0.06	3.4	910
Late	Elokomin	88	Oct	1989		32216	37.	117000	6000	5.37	1.3	0.07	0.8	855
Late	Elokomin	88	Nov	1989		39713	30.	117000	6000	6.62	1.5	0.08	0.9	520
Late	Elokomin	88	Dec	1989		39693	30.	117000	6Doo	6.62	1.5	0.08	0.8	600
Late	Elokomin	89	Dec	1989		-O-	-O-	-O-	-O-	-O-	-O-	-O-	-O-	235000
Late	Elokomin	A	Dec	1989		-O-	-O-	22000	4000	-O-	-O-	-O-	0.	259



**WDF PROGRAM QCO2**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
**May 04, 1990**

Location: Kalama Falls

SPECIES	STOCK	BROOD	DATE * OF FISH	POUNDS MTH YEAR ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	YATER INFLOW CPM	LBS PER CPM	FLOW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
Early	Kalama Falls	A	Dec 1989	-0-	-0-	000	1000	-0-	-0-	-0-	-0-	38
Fall	Kalama Falls	88	Jan 1989	3786	855.	38000	3200	1.18	0.8	0.06	0.	6190
Fall	Kalame Falls	88	Feb 1989	6134	657.	43000	4050	1.51	0.9	0.08	0.	12905
Fall	Kalame Falls	88	Mar 1989	12240	329.	38000	4400	2.78	1.3	0.15	0.	2580
Fall	Kalama Falls	88	Apr 1989	20518	174.	89000	9475	2.17	0.8	0.09	0.	9205
Fall	Kalama Falls	88	May 1989	38276	93.	89000	9475	4.04	1.3	0.13	1.3	10535
Fall	Kalams Falls	88	Jun 1989	1995	123.	10000	1050	1.9	0.6	0.06	0.	26250
Fall	Kalama Falls	88	Jul 1989	1192	112.	5000	425	2.8	0.9	0.08	0.	2280
Fall	Kalams Falls	88	Aug 1989	1700	78.	5000	450	3.78	1.2	0.11	0.6	1010
Fall	Kalama Falls	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	3742000
Fall	Kalams Falls	89	Dec 1989	381	1200.	5000	250	1.52	1.1	0.05	-0-	0
Late	Kalama Falls	87	Jan 1989	37941	25.	55000	5800	6.54	1.1	0.12	1.1	1070
Late	Kalame Falls	87	Feb 1989	41187	23.	55000	5800	7.1	1.4	0.15	1.5	1220
Late	Kalama Falls	87	Mar 1989	47175	20.	55000	5800	8.13	1.6	0.17	1.9	4100
Late	Kalams Falls	87	Apr 1989	58843	16.	55000	5800	10.1	1.8	0.19	0.8	2045
Late	Kalams Falls	88	Mar 1989	894	987.	10000	550	1.63	1.1	0.06	-0-	0
Late	Kalams Falls	88	Apr 1989	1542	659.	10000	1050	1.47	0.9	0.1	0.	3570
Late	Kalame Falls	88	May 1989	2286	429.	10000	1050	2.18	1.2	0.12	1.6	35295
Late	Kalams Falls	88	Jun 1989	4176	234.	29000	2400	1.74	0.7	0.06	0.	3720
Late	Kalama Falls	88	Jul 1989	8380	116.	38000	3200	2.62	0.9	0.08	1.4	4980
Late	Kalame Falls	88	Aug 1989	16428	59.	38000	3600	4.56	1.3	0.12	1.3	2755
Late	Kalams Falls	88	Sep 1989	21415	45.	38000	3600	5.95		0.14	1.5	5535
Late	Kalams Falls	88	Oct 1989	24635	39.	38000	4000	6.16	1.:	0.15	0.	2890
Late	Kalama Falls	88	Nov 1989	31930	30.	38000	4000	7.98	1.8	0.19	1.2	2765
Late	Kalame Falls	88	Dec 1989	31903	30.	55000	5800	5.5	1.2	0.13	E2	675
Late	Kalama Falls	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	116300
Late	Kalams Falls	A	Dec 1989	-0-	-0-	7000	1000	-0-	-0-	-0-	-0-	63
Late	Lewis River	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	157400
Spring	Kalame Falls	88	Jan 1989	1042	685.	10000	800	1.3	0.8	0.07	0.	3135
Spring	Kalams Falls	88	Feb 1989	1312	541.	10000	900	1.46	0.8	0.07	1.2	3685
Spring	Kalama Falls	88	Mar 1989	2116	335.	10000	1200	1.76		E-2	0.7	995
Spring	Kalama Falls	88	Apr 1989	3434	206.	10000	1200	2.86	1.:	0.14	0.7	1475
Spring	Kalame Falls	88	May 1989	1602	104.	5000	525	3.05	0.	0.1	0.	905
Spring	Kalama Falls	88	Jun 1989	1784	93.	5000	525	3.4	1.	0.11	4.7	730
Spring	Kalama Falls	88	Jul 1989	2272	72.	10000	900	2.52	0.7	0.06	1.6	2385
Spring	Kalama Falls	88	Aug 1989	3960	41.	10000	900	4.4	1.	0.09	1.1	1140
Spring	Kalama Falls	88	Sep 1989	4472	36.	10000	900	4.97	1.1	0.1	3.2	1370
Spring	Kalame Falls	88	Oct 1989	6169	26.	10000	1000	6.17	1.2	0.12	0.7	555
Spring	Kalama Falls	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	149300
Spring	Kalama Falls	89	Dec 1989	359	1100.	5000	150	2.39	1.6	0.05	-0-	800
Spring	Kalama Falls	A	Dec 1989	-0-	-0-	19000	1000	-0-	-0-	-0-	-0-	175

WDF PROGRAM QC02  
Hatchery Rearing Parameters and Mortality Summary Report  
May 04, 1990

Location: Klickitat

SPECIES	STOCK	• DATE •		POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW CPM	LBS PER CPM	FLW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
		BROOD MTH	YEAR									
Fall	Priest	88	Jan 1989	1684	990.	14000	1000	1.68	1.1	0.08	-0-	2760
Fall	Priest	88	Feb 1989	7655	608.	64000	6170	1.24	0.7	0.07	0.	32012
Fall	Priest	88	Mar 1989	19854	211.	64000	6491	3.06	1.2	0.13	0.	11046
Fall	Priest	88	Apr 1989	21237	197.	64000	6491	3.27	1.3	0.13	17.	5564
Fall	Priest	88	May 1989	13390	110.	40000	5000	2.68	0.9	0.11	0.	11048
Fall	Priest	88	Jun 1989	22284	66.	40000	5000	4.46	1.3	0.17	1.1	2035
Late	Cowlitz	88	Mar 1989	1991	1010.	24000	910	2.19	1.6	0.06	-0-	46302
Late	Cowlitz	88	Apr 1989	4178	474.	24000	910	4.59	2.5	0.1	0.8	30636
Late	Cowlitz	88	May 1989	6505	272.	41000	2412	2.7	1.2	0.07	0.	30864
Late	Cowlitz	88	Jun 1989	8727	200.	41000	2412	3.62	1.6	0.09	1.9	23604
Late	Cowlitz	88	Jul 1989	13343	130.	62000	4349	3.07	1.1	0.08	0.9	10819
Late	Cowlitz	88	Aug 1989	22760	76.	72000	4983	4.57	1.4	0.1	0.9	3940
Late	Cowlitz	88	Sep 1989	28786	60.	72000	4983	5.78	1.7	0.12	1.1	2600
Late	Cowlitz	88	Oct 1989	26375	54.	101000	4308	6.12	1.7	0.07	0.	4300
Late	Cowlitz	88	Nov 1989	35670	44.	101000	4308	8.28	2.2	0.09	0.	2278
Late	Cowlitz	88	Dec 1989	40243	39.	101000	2200	18.3	4.6	0.1	0.	1197
Late	Elokomin	88	Feb 1989	593	500.	3000	250	2.37	1.4	0.11	-0-	3469
Late	Elokomin	88	Mar 1989	783	375.	3000	250	3.13	1.6	0.13	1.3	2589
Late	Lewis River	87	Jan 1989	42106	29.	80000	9000	4.68	1.	0.11	0.9	1441
Late	Lewis River	87	Feb 1989	46934	26.	80000	5500	8.53	1.8	0.12	1.2	811
Late	Lewis River	87	Mar 1989	58052	21.	80000	4500	12.9	2.7	0.15	1.	1155
Late	Lewis River	87	Apr 1989	47663	19.	80000	4500	10.6	2.	0.11	0.	1035
Late	Lewis River	87	May 1989	15668	19.	80000	4500	3.48	0.7	0.04	0.	5785
Late	Lewis River	87	Jun 1989	8256	19.	80000	4500	1.83	0.4	0.02	0.	2360
Spring	Klickitat	87	Jan 1989	58650	12.	82000	6000	9.77	1.7	0.12	0.4	310
Spring	Klickitat	87	Feb 1989	70250	10.	82000	6000	11.7	1.8	0.13	E1	1259
Spring	Klickitat	87	Mar 1989	77944	9.	82000	6200	12.6	2.	0.15	0.8	1020
Spring	Klickitat	87	Apr 1989	77855	9.	82000	6200	12.6	2.	0.15	E2	535
Spring	Klickitat	88	Jan 1989	4310	416.	27000	2066	2.09	1.	0.08	0.	7735
Spring	Klickitat	88	Feb 1989	7220	244.	41000	4790	1.51	0.6	0.07	1.1	5049
Spring	Klickitat	88	Mar 1989	12543	140.	37000	5290	2.37	0.8	0.12	1.2	5700
Spring	Klickitat	88	Apr 1989	16371	107.	37000	5290	3.09	0.	0.14	1.5	4299
Spring	Klickitat	88	May 1989	15043	83.	106000	4757	3.16	0.9	0.04	0.	4313
Spring	Klickitat	88	Jun 1989	14443	57.	106000	4757	3.04	0.9	0.04	0.	3867
Spring	Klickitat	88	Jul 1989	15603	53.	86000	2813	5.55	1.5	0.05	0.	1281
Spring	Klickitat	88	Aug 1989	19671	42.	86000	2813	6.99	1.6	0.05	1.	646
Spring	Klickitat	88	Sep 1989	20655	40.	86000	2813	7.34	1.7	0.05	0.	626
Spring	Klickitat	88	Oct 1989	21294	37.	83000	2600	8.19	1.8	0.06	4.2	578
Spring	Klickitat	88	Nov 1989	21262	37.	83000	2600	8.18	2.	0.06	E0	661
Spring	Klickitat	88	Dec 1989	26203	30.	83000	5200	5.04	1.2	0.07	0.	575
Spring	Klickitat	89	Dec 1989	790	1233.	14000	612	1.29	1.	0.04	0.	5086
Spring	Wind River	89	Dec 1989	1012	1254.	21000	918	1.1	0.9	0.04	0.	10953

UDF PROGRAM QCO2  
Hatchery Rearing Parameters and Mortality Summary Report  
May 04, 1990

Location: Lewis River

SPECIES	STOCK mm-e	BROOD MTH	DATE * OF FISH		POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
			YEAR	ON HAND	SIZE	VOLUME	INFLOW	PER	INDEX				
						FISH/LB	CU FEET	GPM	CPM				
Early	Lewis River	87	Jan	1989	37735	28.	75000	5000	7.55	1.7	0.11	-0-	1728
Early	Lewis River	87	Feb	1989	42284	25.	75000	5000	8.46	1.9	0.12	0.	263
Early	Lewis River	87	Mar	1989	48000	22.	80000	6000	8.	1.7	0.12	2.3	1148
Early	Lewis River	87	Apr	1989	58616	18.	80000	6000	9.77	1.9	0.14	1.1	875
Early	Lewis River	88	Oct	1989	1711	45.	90000	1800	0.95	0.2	E-3	-0-	406
Early	Lewis River	86	Nov	1989	24877	44.	94000	6160	4.04	1.1	0.07	0.	1438
Early	Lewis River	88	Dec	1989	28772	37.	90000	5800	4.96	1.2	0.08	1.7	1919
Early	Lewis River	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	429000
Early	Lewis River	A	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	481
Late	Lewis River	87	Jan	1989	124128	35.	180000	12200	10.2	2.5	0.17	0.8	4704
Late	Lewis River	87	Feb	1989	135662	32.	255000	16500	8.22	1.9	0.13	1.8	3391
Late	Lewis River	87	Mar	1989	166861	26.	270000	18000	9.27	2.	0.14	1.2	2778
Late	Lewis River	87	Apr	1989	216800	20.	270000	18000	12.	2.4	0.16	1.1	2252
Late	Lewis River	87	May	1989	199450	18.	180000	14000	14.2	2.1	0.16	0.	1839
Late	Lewis River	88	Mar	1989	1801	1153.	16000	1070	1.68	1.3	0.09	-0-	2285
Late	Lewis River	88	Apr	1989	5986	837.	48000	3925	1.53	1.	0.09	0.	20282
Late	Lewis River	88	May	1989	7734	377.	48000	5400	1.43	0.8	0.09	0.	70002
Late	Lewis River	88	Jun	1989	9583	240.	79000	4000	2.4	1.1	0.06	0.	28035
Late	Lewis River	88	Jul	1989	12087	190.	79000	4000	3.02	1.3	0.06	2.7	3412
Late	Lewis River	88	Aug	1989	26662	86.	79000	4000	6.67	2.2	0.11	0.7	3654
Late	Lewis River	88	Sep	1989	24877	92.	90000	5600	4.44	1.5	0.09	E0	11257
Late	Lewis River	88	Oct	1989	37785	60.	180000	7400	5.11	1.5	0.06	1.2	14630
Late	Lewis River	88	Nov	1989	50206	45.	180000	11600	4.33	1.1	0.07	1.4	7835
Late	Lewis River	88	Dec	1989	60975	37.	180000	11600	5.26	1.2	0.08	1.3	3166
Late	Lewis River	89	Dec	1989	-D-	-0-	-0-	-0-	-0-	-0-	-0-	0.	
Late	Lewis River	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	244300 675600
Late	Lewis River	A	Dec	1989	-0-	-0-	-0-	3000	-0-	-0-	-0-	-0-	1117
Late	Washouga l	88	Dec	1989	2237	32.	90000	5800	0.39	-2	E-2	-0-	12
Spring	Kalama Falls	88	Sep	1989	3820	38.	87000	4650	0.82	0.2	0.01	2.4	1563 501
Spring	Kalama Falls	88	Oct	1989	4470	32.	79000	5300	0.84	0.2	0.01		
Spring	Kalama Falls	88	Nov	1989	6173	23.	79000	5300	1.16	0.2	0.02	1.7	1299
Spring	Kalama Falls	88	Dec	1989	8282	17.	79000	5300	1.56	0.3	0.02	1.4	1177
Spring	Lewis River	87	Jan	1989	41641	12.	79000	4100	10.2	1.7	0.09	1.2	796
Spring	Lewis River	87	Feb	1989	49910	10.	79000	5300	9.42	1.5	0.1	0.9	652
Spring	Lewis River	87	Mar	1989	62350	8.	79000	5300	11.8	6.6	0.45	0.7	276
Spring	Lewis River	88	Sep	1989	5433	36.	32000	2600	2.09	0.5	0.04	-0-	686
Spring	Lewis River	88	Oct	1989	6480	30.	32000	2800	2.31	0.5	0.05	2.2	1093
Spring	Lewis River	88	Nov	1989	8417	23.	32000	2880	2.92	0.6	0.05	2.2	827
Spring	Lewis River	88	Dec	1989	11317	17.	32000	2880	3.93	0.7	0.06	1.4	1190

**WDF PROGRAM QC02**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
 May 04, 1990

Location: Loner Kalams

SPECIES	STOCK	BROOD	MTH	DATE OF FISH YEAR	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					ON HAND	SIZE	VOLUME	INFLDU	PER		INDEX	CONV	MORTLTY
					FISH/LB	CU FEET	GPM	CPM					
Early	Kalams Falls	87	Jan	1989	12023	45.	50000	2000	6.01	1.5	0.06	0.	465
Early	Kalam Falls	87	Feb	1989	16405	36.	50000	2000	8.2	2.	0.08	0.	420
Early	Kalams Falls	87	Mar	1989	23593	25.	50000	3500	6.74	1.4	0.1	0.	775
Early	Kalama Falls	87	Apr	1989	39270	1s.	50000	3500	11.2	2.1	0.15	1.1	779
Early	Kalama Falls	87	May	1989	41944	14.	50000	3500	12.	2.1	0.15	1.8	380
Early	Kalams Falls	88	Jan	1989	807	1100.	10000	1200	0.67	0.6	0.07	0.	340
Early	Kalam Falls	88	Feb	1989	1092	810.	10000	1200	0.91	0.6	0.07	0.	2757
Early	Kalama Falls	88	Mar	1989	1555	358.	10000	1200	1.3	0.7	0.08	0.	3362
Early	Kalams Falls	88	Apr	1989	3522	158.	10000	1200	2.93	1.2	0.15	1.4	328
Early	Kalama Falls	88	May	1989	5440	96.	10000	1200	4.53	1.5	0.18	1.2	3388
Early	Kalama Falls	88	Jun	1989	8493	65.	19000	2400	3.54	1.1	0.13	0.	2000
Early	Kalama Falls	88	Jul	1989	13801	40.	19000	2400	5.75	1.5	0.18	0.8	229
Early	Kalams Falls	88	Aug	1989	14914	37.	19000	2400	6.21	1.5	0.19	3.4	203
Early	Kalama Falls	88	Sep	1989	19696	28.	192000	2400	8.21	1.8	0.02	0.6	463
Early	Kalama Falls	88	Sep	1989	19696	28.	192000	2400	8.21	1.8	0.02	0.6	463
Early	Kalams Falls	88	Oct	1989	25080	22.	192000	2400	10.4	2.2	0.03	0.	1033
Early	Kalams Falls	88	Nov	1989	27489	20.	192000	40000	0.69	0.1	0.03	1.5	839
Early	Kalams Falls	88	Dec	1989	30516	18.	74000	4500	6.78	1.3	0.08	0.9	496
Early	Uashougal	87	Jan	1989	1215	45.	50000	2000	0.61	0.2	E-2	0.	155
Early	Uashougal	87	Feb	1989	1515	36.	50000	2000	0.76	0.2	E-2	0.7	140
Early	Uashougal	87	Mar	1989	2176	25.	50000	3500	0.62	0.1	E-2	0.8	155
Early	Uashougal	87	Apr	1989	3616	15.	50000	3500	1.03	0.2	0.01	1.	150
Early	Uashougal	87	May	1989	3901	14.	50000	350	11.1	2.	0.01	0.	35
Fall	Kalama Falls	88	Jan	1989	1404	1000.	19000	2400	0.58	0.5	0.06	0.	850
Fall	Kalams Falls	88	Feb	1989	264s	663.	24000	3000	0.88	0.5	0.07		1000
Fall	Kalama Falls	88	Mar	1989	5680	377.	29000	3600	1.58	0.8	0.1	8.	1522
Fall	Kalama Falls	88	Apr	1989	11134	197.	29000	3600	3.09	1.2	0.15	0.	2169
Fall	Kalams Falls	88	May	1989	21314	102.	100000	6000	3.55	1.2	0.07	1.8	2928
Fall	Kalama Falls	88	Jun	1989	31054	70.	100000	6000	5.18	1.6	0.1	0.9	4800
Fall	Kalama Falls	A	Dec	1989	-o-	-o-	50000	2000	-o-	-o-	-o-	-o-	368
Spring	Kalams Falls	87	Jan	1989	20735	26.	55000	2400	8.64	1.9	0.08	0.	620
Spring	Kalama Falls	87	Feb	1989	26935	20.	55000	2400	11.2	2.2	0.1	0.3	420
Spring	Kalama Falls	87	Mar	1989	44827	12.	50000	3500	12.8	2.3	0.16	0.5	775
Spring	Kalama Falls	87	Apr	1989	53751	10.	50000	3000	17.9	2.9	0.17	1.3	425
Spring	Kalame Falls	88	May	1989	2997	180.	19000	2400	1.25	0.5	0.07	0.	283
Spring	Kalame Falls	88	Jun	1989	4109	131.	19000	2400	1.71	0.6	0.08	2.1	1041
Spring	Kalam Falls	88	Jul	1989	7234	74.	19000	2400	3.01	0.9	0.12	0.8	3020
Spring	Kalams Falls	88	Aug	1989	7838	68.	19000	2400	3.27	0.	0.12	0.8	2398
Spring	Kalama Falls	88	Sep	1989	11082	48.	55000	2300	4.82	1.3	0.05	1.3	1063
Spring	Kalama Falls	88	Oct	1989	12335	43.	55000	2300	5.36	1.4	0.06	5.2	1551
Spring	Kalama Falls	88	Nov	1989	12329	43.	55000	2500	4.93	1.3	0.06	E3	544
Spring	Kalama Falls	88	Dec	1989	13246	40.	55000	3000	4.42	1.1	0.06	4.7	310

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Location: Lyon's Ferry

SPECIES	STOCK	BROOD	DATE	OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
			MTH	YEAR	ON HAND	SIZE	VOLUME	INFLOW	PER	INDEX	INDEX	CONV	MORTLTY
						FISH/LB	CU FEET	GPM	CPM				
Fall	Lyon's Ferry	87	Jan	1989	23637	18.	78000	10005	2.36	0.5	0.06	1.1	1151
Fall	Lyon's Ferry	87	Feb	1989	30277	14.	84000	10075	3.01	0.6	0.07	1.2	1599
Fall	Lyon's Ferry	87	Mar	1989	38067	11.	84000	10768	3.54	0.6	0.08	1.7	5165
Fall	Lyon's Ferry	87	Apr	1989	41301	10.	84000	10768	3.84	0.7	0.09	1.8	5702
Fall	Lyon's Ferry	88	Jan	1989	1276	1038.	15000	3333	0.38	0.3	0.06	-0-	4392
Fall	Lyon's Ferry	88	Feb	1989	5483	504.	30000	6720	0.82	0.4	0.1	0.	21210
Fall	Lyon's Ferry	88	Mar	1989	11098	248.	29000	7254	1.53	0.7	0.16	0.2	11242
Fall	Lyon's Ferry	88	Apr	1989	15742	172.	32000	9952	1.58	0.6	0.18	1.4	49792
Fall	Lyon's Ferry	88	May	1989	23561	100.	40000	14853	1.59	0.5	0.18	0.	62175
Fall	Lyon's Ferry	88	Jun	1989	4709	99.	9000	3000	1.57	0.5	0.16	0.	8342
Fall	Lyon's Ferry	88	Jul	1989	6633	70.	9000	3000	2.21	0.6	0.21	1.3	1949
Fall	Lyon's Ferry	88	Aug	1989	9065	51.	9000	3000	3.02	0.8	0.27	1.2	1986
Fall	Lyon's Ferry	88	Sep	1989	9986	46.	14000	3000	3.33	0.9	0.18	3.2	2984
Fall	Lyon's Ferry	88	Oct	1989	13452	34.	18000	3750	3.59	0.9	0.18	1.	1959
Fall	Lyon's Ferry	88	Nov	1989	16686	29.	36000	9600	1.74	0.4	0.11	0.	2294
Fall	Lyon's Ferry	88	Oec	1989	21822	22.	40000	9600	2.27	0.5	0.12	1.3	3821
Fall	Lyon's Ferry	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	202336
Fall	Lyon's Ferry	A	Dec	1989	-0-	-D-	60000	6000	-0-	-0-	-0-	-D-	333
Spring	Tucannon	87	Feb	1989	14121	11.	8000	2244	6.29	1.1	0.3	0.	474
Spring	Tucannon	87	Mar	1989	17157	9.	8000	2245	7.64	1.2	0.34	0.9	923
Spring	Tucannon	87	Apr	1989	16907	9.	8000	2245	7.53	1.2	0.33	E0	2253
Spring	Tucannon	88	Jan	1989	399	373.	6000	1000	0.4	0.2	0.03	0.	678
Spring	Tucannon	88	Feb	1989	822	181.	6000	1000	0.82	0.3	0.06	0.8	155
Spring	Tucannon	88	Mar	1989	1260	118.	6000	1000	1.26	0.5	0.08	1.3	49
Spring	Tucannon	88	Apr	1989	1804	85.	9000	859	2.1	0.7	0.07	0.	607
Spring	Tucannon	88	May	1989	2512	61.	6000	1300	1.93	0.6	0.12	1.1	120
Spring	Tucannon	88	Jun	1989	2888	53.	22000	MOO	0.41	0.1	0.03	3.3	159
Spring	Tucannon	88	Jul	1989	4027	38.	23000	7000	0.58	0.1	0.04	1.3	65
Spring	Tucannon	88	Aug	1989	5132	30.	9000	6700	0.77	0.2	0.13	0.	51
Spring	Tucannon	88	Sep	1989	6118	25.	9000	6700	0.91	0.2	0.15	1.7	25
Spring	Tucannon	88	Oct	1989	6951	22.	20000	6030	1.15	0.2	0.07	2.8	25
Spring	Tucannon	88	Nov	1989	9551	16.	8000	2150	4.44	0.9	0.23	0.8	116
Spring	Tucannon	88	Dec	1989	10143	15.	8000	2150	4.72	0.9	0.23	2.5	663
Spring	Tucannon	89	Dec	1989	112	932.	6000	1200	0.09	-2	0.01	-0-	715
Spring	Tucannon	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-D-	26600
Spring	Tucannon	A	Dec	1989	-0-	-0-	8050000	2240	-0-	-0-	-0-	-0-	24



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Location: Ringold

SPECIES	STOCK	BROOD	• DATE • MTH YEAR	POUNDS	AVERAGE	POND	WATER	LBS	FLOU INDEX	DENSITY	FOOD	MONTHLY
				OF FISH ON HAND -mm-m-e-	SIZE FISH/LB	VOLUME CU FEET -e-me-	INFLOU CPM	PER CPM		INDEX	CONV -e-em-	MORTLTY
Spring	Klickitat	88	Feb 1989	4615	258.	23000	4200	1.1	0.5	0.09	-o-	7035
Spring	Klickitat	88	Mar 1989	8435	141.	23000	4550	1.85	0.7	0.14	1.4	1293
Spring	Klickitat	88	Apr 1989	15842	75.	23000	5250	3.02	0.9	0.22	0.9	1267
Spring	Klickitat	88	May 1989	20824	57.	23000	6300	3.31	0.9	0.26	1.7	1220
Spring	Klickitat	88	Jun 1989	29651	40.	23000	6300	4.71	1.2	0.33	1.5	937
Spring	Klickitat	88	Jul 1989	35904	33.	23000	6300	5.7		0.39	0.9	9849 1199
Spring	Klickitat	88	Aug 1989	47000	25.	2940000	8300	5.66	14.12	E-3		
Spring	Klickitat	88	Sep 1989	46428	25.	2940000	8300	5.59	1.2	E-3	EI	14300
Spring	Klickitat	88	Oct 1989	48035	20.	2940000	8300	5.79	1.1	E-3	0.	
Spring	Klickitat	88	Nov 1989	75833	12.	2940000	7400	10.2	1.8	E-3	0.7	20000 50700
Spring	Klickitat	88	Dec 1989	90000	10.	2940000	6300	14.3	2.3	E-3	1.1	10000

**WDF PROGRAM QC02**  
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Location: Rocky Reach

SPECIES	STOCK	* DATE		POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW CPM	LBS PER CPM	FLOW INDEX	DENSITY INDEX	FOOD MONTHLY	
		BROOD MTH	YEAR								CONV	MORTLTY
Early	Big Creek	87	Jan 1989	24089	16.	34000	4400	5.47	1.1	0.14	1.1	100
Early	Big Creek	87	Feb 1989	25693	15.	34000	4400	5.84	1.1	0.14	1.4	33
Early	Big Creek	87	Mar 1989	27526	14.	34000	4400	6.26	1.1	0.15	1.5	34
Early	Big Creek	87	Apr 1989	29630	13.	34000	4000	7.41	1.3	0.16	2.1	166
Early	Grays River	89	Dec 1989	-0-	-0-	-D-	-0-	-0-	-0-	-D-	0.	6000
Early	Lewis River	89	Dec 1989	-0-	-0-	-O-	-0-	-0-	-0-	-O-	0.	12000
Fall	Priest	87	Jan 1989	15865	12.	34000	4400	3.61	0.6	0.08	1.3	616
Fall	Priest	87	Feb 1989	17294	11.	34000	4400	3.93	0.6	0.08	1.6	151
Fall	Priest	87	Mar 1989	19016	10.	34000	4400	4.32	0.7	0.09	1.5	70
Fall	Priest	87	Apr 1989	19000	10.	34000	4000	4.75	0.8	0.09	E2	167
Fall	Priest	88	Feb 1989	338	700.	2000	350	0.97	0.7	0.12	-0-	8300
Fall	Priest	88	Mar 1989	478	485.	2000	350	1.37	0.8	0.14	1.4	4755
Fall	Priest	88	Apr 1989	633	380.	3000	700	0.9	0.5	0.12	0.	1150
Fall	Priest	88	May 1989	1197	200.	3000	800	1.5	0.6	0.16	0.9	1295
Fall	Priest	88	Jun 1989	2055	115.	5000	1050	1.96	0.7	0.14	0.	3100
Fall	Priest	88	Jul 1989	2641	89.	13000	2800	0.94	0.3	0.07	1.8	1330
Fall	Priest	88	Aug 1989	3906	60.	13000	2800	1.39	0.4	0.09	1.3	700
Fall	Priest	88	Sep 1989	5695	41.	13000	2800	2.03	0.5	0.1	1.2	870
Fall	Priest	88	Oct 1989	7756	30.	13000	2800	2.77	0.6	0.12	1.3	800
Fall	Priest	88	Nov 1989	8559	27.	34000	4000	2.14	0.4	0.05	3.9	1600
Fall	Priest	88	Dec 1989	14437	16.	34000	4000	3.61	0.6	0.08	1.	100
Fall	Wells	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	10000
Late	Coultitz	88	Mar 1989	475	1149.	3000	500	0.95	0.7	0.12	0.	5695
Late	Coultitz	88	Apr 1989	743	721.	3000	500	1.49	0.	0.16	1.2	10600
Late	Coultitz	88	May 1989	1426	362.	3000	2000	0.71	0.3	0.09	0.	19405
Late	Coultitz	88	Jun 1989	2723	187.	8000	1750	1.56	0.6	0.14	1.1	7000
Late	Coultitz	88	Jul 1989	3873	125.	34000	4000	0.97	0.4	0.04	1.6	25100
Late	Coultitz	88	Aug 1989	5339	90.	34000	4000	1.33	0.4	0.05	1.5	3670
Late	Coultitz	88	Sep 1989	7083	67.	34000	4000	1.77	0.5	0.06	1.3	5930
Late	Coultitz	88	Oct 1989	9677	49.	34000	4000	2.42	0.6	0.08	1.1	400
Late	Coultitz	88	Nov 1989	13944	34.	34000	4000	3.49	0.8	0.1	1.2	100
Late	Coultitz	88	Dec 1989	18960	25.	34000	4000	4.74	0.	0.12	1.5	100

**WDF PROGRAM QC02**  
**Hatchery Rearing Parameters and Mortality Summary Report**  
**May 04, 1990**

Location: Speelyai

SPECIES	STOCK	BROOD	• DATE •		POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW GPM	LBS PER CPM	FLOW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
			MTH	YEAR									
Early	Lewis River	87	Jan	1989	5255	29.	7000	500	10.5	2.4	0.17	0.	100
Early	Lewis River	87	Feb	1989	5439	28.	7000	500	10.9	2.4	0.17	3.	100
Early	Lewis River	87	Mar	1989	6088	25.	MOO	500	12.2	2.4	0.17	1.1	100
Early	Lewis River	87	Apr	1989	7605	20.	MOO	500	15.2	3.1	0.22	0.4	100
Early	Lewis River	87	May	1989	a444	18.	7000	500	16.9	3.3	0.23	1.3	100
Early	Lewis River	87	Jun	1989	a433	18.	7000	500	16.9	3.3	0.23	E1	200
Early	Lewis River	88	Jan	1989	1761	1060.	21000	1050	1.68	1.3	0.06	0.	1000
Early	Lewis River	88	Feb	1989	2308	800.	21000	1050	2.2	1.5	0.08	0.8	20500
Early	Lewis River	88	Mar	1989	3244	500.	59000	2800	1.16	0.7	0.03	0.	24700
Early	Lewis River	88	Apr	1989	9646	167.	59000	2800	3.44	1.4	0.07	0.4	12500
Early	Lewis River	88	May	1989	12396	129.	59000	3000	4.13	1.7	0.09	1.7	10400
Early	Lewis River	88	Jun	1989	15044	106.	60000	4500	3.34	1.2	0.09	2.6	4400
Early	Lewis River	88	Jul	1989	11573	98.	41000	3000	3.86		0.1	0.	2400
Early	Lewis River	88	Aug	1989	13650	83.	41000	3000	4.55	1::	0.11	2.5	1200
Early	Lewis River	88	Sep	1989	18254	62.	41000	3000	6.08	1.8	0.13	1.3	1200
Early	Lewis River	88	Oct	1989	21076	50.	41000	3000	7.03	1.9	0.14	1.5	600
Early	Lewis River	88	Nov	1989	3356	44.	7000	500	6.71	1.7	0.12	0.	100
Early	Lewis River	88	Dec	1989	3556	37.	7000	600	5.93	1.5	0.13	0.	100
Early	Lewis River	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	260000
Early	Lewis River	A	Dec	1989	-D-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	46
Spring	Lewis River	88	Jan	1989	1565	631.	21000	1100	1.42	0.9	0.05	0.8	2200
Spring	Lewis River	88	Feb	1989	2233	441.	21000	1100	2.03	1.1	0.06	0.9	2800
Spring	Lewis River	88	Mar	1989	3960	248.	21000	1200	3.3	1.5	0.09	1.3	2800
Spring	Lewis River	88	Apr	1989	4390	211.	21000	1700	2.58	1.1	0.09	2.8	6300
Spring	Lewis River	88	May	1989	5239	186.	35000	2500	2.1	0.9	0.06	0.	1300
Spring	Lewis River	88	Jun	1989	973s	100.	35000	2500	3.89	1.3	0.1	0.7	1000
Spring	Lewis River	88	Jul	1989	8497	113.	59000	4200	2.02	0.6	0.04	E0	3200
Spring	Lewis River	88	Aug	1989	17429	55.	59000	4200	4.15	1.2	0.08	0.8	1500
Spring	Lewis River	88	Sep	1989	6764	31.	18000	1200	5.64	1.3	0.09	0.	100
Spring	Lewis River	88	Oct	1989	6761	31.	18000	1200	5.63	1.3	0.09	E2	100
Spring	Lewis River	88	Nov	1989	9104	23.	18000	1200	7.59	1.6	0.11	0.7	200
Spring	Lewis River	88	Dec	1989	10465	20.	18000	2400	4.36	0.9	0.12	1.5	100
Spring	Lewis River	89	Dec	1989	-0-	-D-	-0-	-0-	-0-	-0-	-0-	-0-	155000
Spring	Lewis River	A	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-D-	-0-	78

WDF PROGRAM QC02  
Hatchery Rearing Parameters and Mortality Summary Report  
May 04, 1990

Location: Toutle

SPECIES	STOCK	BROOD	MTH	* DATE *	YEAR	POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW CPM	LBS PER CPU	FLOW INDEX	DENSITY INDEX	F000 CONV	MONTHLY MORTLTLY
Early	Grays River	87	Feb	1989		8977	24.	157000	4032	2.23	0.5	0.01	-0-	150
Early	Grays River	87	Mar	1989		10762	20.	157000	3719	2.89	0.6	0.01	1.4	200
Early	Grays River	87	Apr	1989		15300	15.	157000	3700	3.88	0.8	0.02	0.8	150
Early	Grays River	87	May	1989		15300	14.	157000	3700	4.14	0.8	0.02	2.6	800
Fall	Elokomin	88	MAY	1989		33300	72.	225000	3719	8.95	2.7	0.05	0.	1800
						37293	64.	225000	3719	10.	2.7	0.05	1.1	12000
Fall	Grays River	88	Feb	1989		5055	351.	225000	4032	1.25	0.6	0.01	-0-	371
Fall	Grays River	88	Mar	1989		10757	27.	225000	3719	2.89	0.6	0.01	0.	2100
Fall	Grays River	88	Apr			17651	136.	225000	3719	4.75	2.2	0.04	0.	6800

UDF PROGRAM QCO2  
 Hatchery Rearing Parameters and Mortality Summary Report  
 May 04, 1990

Location: Tucannon

SPECIES	STOCK	BROOD	* DATE	• OF FISH	POUNDS ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	UATER INFLOU GPM	LBS PER CPM	FLOU INDEX	DENSITY INDEX	F000 CONV	MONTHLY MORTLTY
Spring	Tucannon	87	Jan	1989	14165	11.	8000	2244	6.31	1.1	0.31	0.8	262

UDF PROGRAM QCO2  
Hatchery Rearing Parameters and Mortality Summary Report  
May 04, 1990

Location: Uashougal

SPECIES	STOCK	BROOD	* DATE MTH YEAR	POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	UATER INFLOU GPM	LBS PER GPM	FLOW INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
Fall	Priest	88	Feb 1989	560	950.	7000	265	2.11	1.3	0.05	-0-	2000
Fall	Priest	88	Mar 1989	3053	492.	240000	5060	0.6	0.3	E-2	0.	5417
Fall	Priest	88	Apr 1989	5435	216.	446000	11000	0.49	0.2	E-2	0.	2480
Fall	Priest	88	May 1989	12553	97.	445000	10040	1.25	0.3	E-2	0.	
Fall	Priest	88	Jun 1989	14839	82.	42000	9000	1.65	0.5	0.11	1.1	69 70
Fall	Uashougal	88	Jan 1989	3841	1086.	52000	2080	1.85	1.2	0.05	-0-	9210
Fall	Uashougal	88	Feb 1989	5954	870.	7000	2650	2.25	1.4	0.53	0.	28644
Fall	Uashougal	88	Mar 1989	10912	437.	224000	5590	1.95	1.1	0.03	1.	5650
Fall	Uashougal	88	Apr 1989	23718	213.	459000	11550	2.05	0.9	0.02	0.	2480
Fall	Uashougal	88	May 1989	50912	98.	459000	10590	4.81	1.7	0.04	0.	1453
Fall	Uashouga L	88	Jun 1989	7909	66.	459000	10590	0.75	0.2	E-2	0.	751
Fall	Uashougal	88	Jul 1989	10200	51.	39000	1560	6.54	1.8	0.07	1.4	687
Fall	Uashougal	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	730000
Fall	Uashouga L	A	Dec 1989	-0-	-0-	-0-	6000	-0-	-0-	-0-	-0-	484
Late	Lewis River	88	Mar 1989	3531	1044.	51000	2130	1.66	1.2	0.05	-0-	6821
Late	Lewis River	88	Apr 1989	7437	457.	57000	1865	3.99	2.3	0.08	0.	14027
Late	Lewis River	88	May 1989	13902	232.	86000	2980	4.67	2.1	0.07	0.	
Late	Lewis River	88	Jun 1989	15324	159.	156000	5205	2.94	1.2	0.04	0.	61131 13771
Late	Lewis River	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	604900
Late	Uashouga L	87	Jan 1989	123200	26.	490000	9240	13.3		0.06	1.2	87
Late	Uashouga L	87	Feb 1989	127628	25.	490000	10240	12.5	;	0.06	5.4	357
Late	Uashouga L	87	Mar 1989	159080	20.	483000	12140	13.1	2.7	0.07	0.	1044
Late	Uashougal	87	Apr 1989	26736	19.	70000	2240	11.9	2.4	0.08	0.	3833
Late	Uashougal	87	May 1989	2970	17.	70000	2240	1.33	0.3	E-2	0.	1492
Late	Uashougal	88	Apr 1989	454	562.	7000	260	1.75	1.1	0.04	0.8	4804 860
Late	Uashouga L	88	May 1989	1063	235.	7000	265	4.01	1.8	0.07		
Late	Uashougal	88	Jun 1989	1203	160.	10000	320	3.76	1.5	0.05	0.	1358
Late	Uashouga l	88	Jul 1989	29897	114.	198000	6960	4.3	1.5	0.05	0.	6599
Late	Uashougal	88	Aug 1989	42960	79.	200000	6960	6.17	2.	0.07	1.3	5088
Late	Uashougal	88	Sep 1989	52781	64.	198000	6960	7.58	2.2	0.08	1.7	2463
Late	Uashougal	88	Oct 1989	66128	50.	71000	5960	11.1	3.	0.25	1.5	987
Late	Uashougal	88	Nov 1989	78366	42.	77000	6200	12.6	3.2	0.26	1.7	490
Late	Uashouga l	88	Dec 1989	91082	35.	76000	6200	14.7	3.6	0.29	1.8	226
Late	Uashouga l	89	Dec 1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	136600
Late	Uashouga l	A	Dec 1989	-0-	-0-	-0-	6000	-0-	-0-	-0-	-0-	34

UDF PROGRAM PC02  
Hatchery Rearing Parameters and Mortality Summary Report  
May 04, 1990

Location: Uells Spawning

SPECIES	STOCK	BROOD	MTH	DATE * OF FISH YEAR	POUNDS OF FISH ON HAND	AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	UATER INFLDU GPM	LBS PER GPM	FLOU INDEX	DENSITY INDEX	FOOD CONV	MONTHLY MORTLTY
Spring	Leavenworth	88	Jan	1989	2417	75.	4000	900	2.69	2.2	0.5	0.	137
Spring	Leavenworth	88	Feb	1989	2788	65.	6000	1350	2.07	1.2	0.26	3.2	218
Spring	Leavenworth	88	Mar	1989	4022	45.	6000	1350	2.98	0.7	0.16	1.4	229
Spring	Leavenworth	88	Apr	1989	5016	36.	6000	1350	3.72	0.9	0.2	1.6	453
Summer	Uells	87	Jan	1989	35875	12.	38000	4725	7.59	1.2	0.15	2.5	767
Summer	Uells	87	Feb	1989	39109	11.	38000	4725	8.28	1.3	0.17	0.	269
summer	Uells	87	Nar	1989	42986	10.	38000	4725	9.1	1.5	0.18	0.	411
Summer	Uells	87	Apr	1989	47671	9.	38000	4725	10.1	1.6	0.19	EI	820
Sumner	Uells	88	Jan	1989	4946	450.	12000	2500	1.98	1.3	0.26	0.	48932
Summer	Uel Is	88	Feb	1989	6821	389.	17000	3150	2.17	1.3	0.24	0.	12529
Summer	Uells	88	Mar	1989	14612	180.	32000	7200	2.03	1.1	0.25	0.9	20751
Summer	Uells	88	Apr	1989	20903	125.	32000	5200	4.02	1.3	0.22	1.5	18527
Summer	Uells	88	May	1989	6829	120.	44000	3350	2.04	1.	0.08	0.	10571
Summer	Uells	88	Jun	1989	16321	50.	44000	3350	4.87	2.4	0.18	0.2	3375
Summer	Uells	88	Jul	1989	23238	35.	36000	4590	5.06	1.3	0.16	0.6	2705
Summer	Uells	88	Aug	1989	14347	28.	30000	2390	6.	1.4	0.11	0.	235
Summer	Uells	88	Sep	1989	22300	18.	30000	2390	9.33	1.8	0.14	0.9	315
Summer	Uells	88	Oct	1989	25074	16.	30000	2390	10.5	1.9	0.15	2.2	215
Summer	Uells	88	Nov	1989	30833	13.	30000	6500	4.74	0.8	0.18	1.5	350
Smner	Uells	88	Dec	1989	39995	ID.	30000	6500	6.15	0.	0.21	1.2	860
Summer	Wells	89	Dec	1989	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	273900
Summer	Uells	89	Dec	1989	325	736.	3000	300	1.08	0.8	0.08	-0-	3690
Summer	Uells	A	Dec	1989		-0-	-0-	-0-	-0-	-0-	-0-	0.	140

## APPENDIX F

Appendix F contains the Yearly Medication report. Medication usage is listed by type of medication for each pathogen for the calendar year 1989.

### Dosage:

Formalin = parts per million (ppm)  
Diquat = ppm  
Romet = % body weight fed  
TM50 = % body weight fed  
Gallimycin = % body weight fed  
Sulmet = % body weight fed  
Malachite = number of treatments per month  
Epsom salts = % of feed by weight  
Erythromycin = number of injections per month  
Terramycin = number of injections per month

### Amount:

Formalin = gallons  
Diquat = gallons  
Romet = pounds  
TM50 = pounds  
Gallimycin = pounds  
Sulmet = pounds  
Malachite = gallons  
Epsom salts = pounds  
Erythromycin & Terramycin = none

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 Yearly Medication Report  
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Agent: Gill Amoeba

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	167	5G	Rocky Reach	Fall	Priest	88	41.

Agent: Bacterial Gill Dis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Diguat	35PPM	11G	Kalama Falls	Fall	Kalama	88	123.
	33PPM	16G	Lower Kalama	Fall	Kalama	88	70.
	40PPM	.75G	Lyon's Ferry	Fall	Lyon's	88	248.
	40PPM	26G	Lyon's Ferry	Fall	Lyon's	88	172.
	40PPM	9G	Lyon's Ferry	Fall	Lyon's	88	100.

Agent: BHS

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
TM50	2%	4800	Elokomin	Fall	Elokomin	88	60.
	2%	220	Kalama Falls	Fall	Kalama	88	123.
	2%	800	Lower Kalama	Fall	Kalama	88	70.

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Agent: Bacterial Kidney Dis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Erythromycin							
	1		Lyon's Ferry	Fall	Lyon's	A	- 0 -
	2		Lyon's Ferry	Spring	Tucannon	A	- 0 -
	2		Wells	Summer	Wells	A	- 0 -
Gallimycin							
	1%	7880	Cowlitz	Spring	Cowlitz	87	194.
	2%	9000	Cowlitz	Spring	Cowlitz	88	45.
	2%	25000	Cowlitz	Spring	Cowlitz	88	18.
	2%	138	Kalama Falls	Spring	Kalama	88	72.
	2%	862	Kalama Falls	Spring	Kalama	88	41.
	2%	970	Klickitat	Fall	Priest	88	197.
	1%	5145	Klickitat	Late	Cowlitz	88	44.
	1%	5145	Klickitat	Late	Cowlitz	88	39.
	1%	4500	Klickitat	Spring	Klickitat	87	225.
	2%	155	Klickitat	Spring	Klickitat	88	244.
	2%	1009	Klickitat	Spring	Klickitat	88	140.
	1%	6550	Klickitat	Spring	Klickitat	87	138.
	2%	970	Klickitat	Spring	Klickitat	88	107.
	2%	160	Klickitat	Spring	Klickitat	88	53.
	1%	3190	Klickitat	Spring	Klickitat	88	42.
	1%	5145	Klickitat	Spring	Klickitat	88	835.
	2%	1503	Lewis River	Spring	Kalama	88	23.
	2%	1980	Lewis River	Spring	Lewis River	88	23.
	2%	1750	Lower Kalama	Early	Kalama	88	20.
	2%	692	Lower Kalama	Spring	Kalama	88	180.
	2%	1300	Lower Kalama	Spring	Kalama	88	131.
	2%	3250	Lower Kalama	Spring	Kalama	88	43.
	2%	1750	Lower Kalama	Spring	Kalama	88	43.
	2%	1186	Lyon's Ferry	Fall	Lyon's	88	99.
	2%	364	Lyon's Ferry	Fall	Lyon's	88	70.
	2%	166	Lyon's Ferry	Spring	Tucannon	88	181.
	2%	112	Lyon's Ferry	Spring	Tucannon	88	118.
	2%	700	Lyon's Ferry	Spring	Tucannon	88	53.
	2%	250	Lyon's Ferry	Spring	Tucannon	88	38.
	2%	560	Ringold	Spring	Klickitat	88	258.
	2%	1940	Ringold	Spring	Klickitat	88	141.
	2%	5312	Ringold	Spring	Klickitat	88	57.
	2%	4500	Ringold	Spring	Klickitat	88	33.
	1.5%	136	Rocky Reach	Fall	Priest	88	380.
	1.6%	712	Rocky Reach	Fall	Priest	88	60.
	1.6%	788	Rocky Reach	Fall	Priest	88	41.
	2%	1510	Speelyai	Spring	Lewis River	88	100.
	2%	1510	Speelyai	Spring	Lewis River	88	31.
	2%	6217	Wells	Summer	Wells	88	125.
	2%	530	Wells	Summer	Wells	88	35.
	2%	3221	Wells	Summer	Wells	88	28.

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Agent: Botulism

Medication	Dosage	Amount	Location	Species	stock	Brood	Fish Size
TM50	2%	3520	Ringold	Spring	Klickitat	88	12.

Agent: Columnaris

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Terramycin	1		Priest Rapids	Fall	Priest	A	-0-
TM50	2%	835	Rocky Reach	Late	Cowlitz	88	125.
	2.2%	895	Rocky Reach	Late	Cowlitz	88	90.
	2%	1200	Rocky Reach	Late	Cowlitz	88	67.

Agent: CWD/EIBS/FUNGUS

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	167	1680G	Cowlitz	Late	Cowlitz	87	399.
	167	186G	Cowlitz	Late	Cowlitz	87	175.
Oxolinic Acid	10MG/KG	4#	Cowlitz	Late	Cowlitz	87	399.
TM50	2%	5005	Cowlitz	Late	Cowlitz	88	49.
	2%	22850	Cowlitz	Late	Cowlitz	88	44.
	2%	220	Lyon's Ferry	Fall	Lyon's	88	51.

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Agent: Costia

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
-----							
Formalin							
	167	63G	Cowlitz	Fall	Cowlitz	88	159.
	167	166G	Cowlitz	Fall	Cowlitz	88	97.
	167	126G	Cowlitz	Fall	Cowlitz	88	64.
	167	36G	Cowlitz	Fall	Cowlitz	88	64.
	143	48G	Cowlitz	Late	Cowlitz	88	293.
	167	42G	Cowlitz	Late	Cowlitz	88	160.
	167	58G	Cowlitz	Spring	Cowlitz	88	300.
	167	62G	Cowlitz	Spring	Cowlitz	88	135.
	167	114G	Cowlitz	Spring	Cowlitz	88	65.
	167	16G	Elokomin	Early	Grays River	88	140.
	167	24G	Elokomin	Early	Elokomin	88	131.
	167	4G	Elokomin	Fall	Elokomin	88	60.
	167	20G	Elokomin	Late	Elokomin	88	144.
	167	30G	Grays River	Early	Grays River	88	172.
	167	6G	Kalama Falls	Fall	Kalama	88	657.
	167	48G	Kalama Falls	Fall	Kalama	88	174.
	167	208G	Kalama Falls	Fall	Kalama	88	123.
	167	12G	Kalama Falls	Late	Kalama	88	429.
	167	12G	Kalama Falls	Spring	Kalama	88	541.
	167	8G	Kalama Falls	Spring	Kalama	88	206.
	167	55G	Lewis River	Late	Lewis River	88	190.
	167	3G	Lower Kalama	Fall	Kalama	88	377.
	83	56G	Lower Kalama	Fall	Kalama	88	70.
	167	12G	Lower Kalama	Spring	Kalama	88	131.

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Agent: Cold Water Disease

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Oxolinic Acid							
	1OMG/KG	17#	Kalama Falls	Late	Kalama	88	429.
	1OMG/KG	:11#	Kalama Falls	Late	Kalama	88	234.
	1OMG/KG	1.45#	Lewis River	Late	Lewis River	88	240.
	1OMG/KG	.3#	Rocky Reach	Late	Cowlitz	88	187.
Romet							
	2%	176	Lewis River	Late	Lewis River	88	837.
	1%	176	Rocky Reach	Late	Cowlitz	88	362.
TM50							
	2%	1265	Cowlitz	Fall	Cowlitz	88	14.
	2%	5400	Cowlitz	Late	Cowlitz	87	30.
	2%	6000	Cowlitz	Late	Cowlitz	87	25.
	1%	30000	Cowlitz	Late	Cowlitz	87	849.
	2%	570	Cowlitz	Late	Cowlitz	88	293.
	2%	9125	Cowlitz	Late	Cowlitz	88	160.
	2%	11485	Cowlitz	Late	Cowlitz	88	85.
	2%	2760	Cowlitz	Late	Cowlitz	88	37.
	2%	6700	Cowlitz	Late	Cowlitz	88	33.
	2%	11995	Cowlitz	Spring	Cowlitz	88	20.
	1%	240	Elokomin	Early	Grays River	88	140.
	2%	430	Elokomin	Early	Elokomin	88	231.
	2%	356	Elokomin	Early	Grays River	88	89.
	2%	582	Elokomin	Late	Elokomin	88	187.
	1.4%	342	Grays River	Early	Grays River	88	494.
	2%	370	Grays River	Early	Grays River	88	284.
	2%	1169	Grays River	Early	Grays River	88	104.
	2%	1000	Kalama Falls	Late	Kalama	87	865.
	2.2%	440	Kalama Falls	Late	Kalama	88	429.
	2%	5000	Kalama Falls	Late	Kalama	88	30.
	2%	87	Klickitat	Late	Cowlitz	88	1010.
	2%	36	Klickitat	Late	Cowlitz	88	1010.
	2%	178	Klickitat	Late	Elokomin	88	375.
	2%	681	Klickitat	Late	Cowlitz	88	474.
	2%	1060	Klickitat	Late	Cowlitz	88	272.
	2%	763	Klickitat	Late	Cowlitz	88	200.
	2%	22	Klickitat	Late	Cowlitz	88	130.
	2%	80	Lewis River	Early	Lewis River	88	45.
	2%	110	Lewis River	Early	Lewis River	88	44.
	1.5%	485	Lewis River	Late	Lewis River	88	837.
	2%	213	Lewis River	Late	Lewis River	88	837.
	2%	2459	Lewis River	Late	Lewis River	88	377.
	2%	5653	Lewis River	Late	Lewis River	88	60.
	2%	1928	Lewis River	Late	Lewis River	88	45.
	2%	740	Lewis River	Spring	Kalama	88	32.
	2%	1062	Lewis River	Spring	Lewis River	88	-30.
	2%	350	Lower Kalama	Early	Kalama	88	358.
	2.2%	700	Lower Kalama	Early	Kalama	88	96.
	2%	103	Rocky Reach	Late	Cowlitz	88	721.
	2%	211	Rocky Reach	Late	Cowlitz	88	362.
	2%	116	Speelyai	Early	Lewis River	88	800.
	2%	660	Speelyai	Early	Lewis River	88	500.

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Agent: Cold Water Disease

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
I'M-50	2%	62	Washougal	Fall	Washougal	88	870.
	2%	112	Washougal	Fall	Washougal	88	437.
	2%	320	Washougal	Late	Washougal	87	449.
	2%	2140	Washougal	Late	Lewis River	88	232.
	2%	252	Washougal	Late	Washougal	87	262.
	2%	213	Washougal	Late	Washougal	88	235.
	1.5%	610	Washougal	Late	Lewis River	88	159.

Agent: Epistylis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	83	110G	Lewis River	Late	Lewis River	87	363.
	40	25G	Lower Kalama	Early	Washougal	87	446.
	40	25G	Lower Kalama	Early	Kalama	87	470.
	167	42G	Washougal	Late	Washougal	87	25.
	167	12G	Washougal	Late	Washougal	87	262.

Agent: Enteric Redmouth Disease

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Romet	1.5	319	Grays River	Fall	Grays River	88	61.
	1%	121	Grays River	Fall	Grays River	88	50.
	1%	217	Klickitat	Spring	Klickitat	88	83.
	1%	45	Klickitat	Spring	Klickitat	88	53.
	TM50	2%	555	Elokomin	Fall	Elokomin	88
2%		606	Grays River	Fall	Grays River	88	61.
2%		910	Lower Kalama	Spring	Kalama	88	68.

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Agent: Saprolegnia

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin							
	167	441G	Cowlitz	Late	Cowlitz	88	37.
	1667	68G	Elokomin	Fall	Elokomin	89	969.
	2000	423G	Elokomin	Fall	Elokomin	A	
	1667	24G	Elokomin	Late	Elokomin	89	EGG
	1667	17G	Grays River	Fall	Kalama	89	EGG
	1667	2446	Kalama Falls	Fall	Kalama	89	1200.
	200	26G	Kalama Falls	Late	Kalama	A	
	1667	30G	Kalama Falls	Late	Lewis River	89	EGG
	1667	36G	Kalama Falls	Late	Kalama	89	EGG
	1667	56G	Kalama Falls	Spring	Kalama	89	1100.
	200	921G	Kalama Falls	Spring	Kalama	A	
	143	4366	Lewis River	Early	Lewis River	A	
	1667	18G	Lewis River	Early	Lewis River	89	EGG
	1667	202G	Lewis River	Late	Lewis River	89	EGG
	143	271G	Lewis River	Late	Lewis River	A	
	1667	7G	Lewis River	Late	Lewis River	89	EGG
	1667	605G	Lewis River	Spring	Lewis River	88	30.
	200	36G	Lower Kalama	Fall	Kalama	A	
	1667	467G	Lyon's Ferry	Fall	Lyon's	89	EGG
	143	2833G	Lyon's Ferry	Fall	Lyon's	A	
	1667	33G	Lyon's Ferry	Spring	Tucannon	89	932.
	200	135G	Lyon's Ferry	Spring	Tucannon	A	
	1667	2756	Priest Rapids	Fall	Priest	89	EGG
	167	1550G	Priest Rapids	Fall	Priest	A	
	1667	216G	Priest Rapids	Fall	Priest	88	
	1667	43G	Speelyai	Early	Lewis River	89	EGG
	200	3976	Speelyai	Early	Lewis River	A	
	200	2413G	Speelyai	Spring	Lewis River	A	
	1667	16G	Speelyai	Spring	Lewis River	89	EGG
	1667	169G	Washougal	Fall	Washougal	89	EGG
	1667	32G	Washougal	Late	Washougal	89	EGG
	1667	49G	Washougal	Late	Lewis River	89	EGG
	2000	423G	Washougal	Late	Washougal	88	
	167	2760G	Wells	Summer	Wells	A	
	1667	50G	Wells	Summer	Wells	89	736.

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Agent: Furunculosis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Terramycin	1		Lewis River	Early	Lewis River	A	
	1		Lewis River	Late	Lewis River	A	
<del>TM50</del>	2%	1338	Lower Kalama	Early	Kalama	88	37.
	2%	<del>1400</del>	Lower Kalama	Spring	Kalama	88	74.
	2%	1000	Lower Kalama		Kalama	88	48.

agent: Ichthyophthirius

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	167	54G	Grays River	Fall	Elokomin	88	400.
	167	78G	Grays River	Fall	Grays River	88	594.
	167	42G	Kalama Falls	Fall	Kalama	88	112.
	167	6G	Kalama Falls	Fall	Kalama	88	78.
	167	84G	Kalama Falls	Spring	Kalama	88	72.
	25	330	Ringold	Spring	Klickitat	88	25.
	25	6050	Ringold	Spring	Klickitat	88	20.
	167	324G	Wells	Summer	Wells	88	13.
	167	390G	Wells	Summer	Wells	88	1100.

Agent: Prophylactic

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Erythromycin	1		Kalama Falls	Spring	Kalama	A	

Agent: Tail Rot

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	167	168G	Rocky Reach	Fall	Priest	88	27.

Agent: Trichodina

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	167	48G	Kalama Falls	Late	Kalama	88	39.

Agent: Trichophrya

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	40	25G	Lower Kalama	Early	Kalama	87	470.
	40	25G	Lower Kalama	Early	Washougal	87	446.